

University of Illinois at Urbana-Champaign  
 ASRM 469 Casualty Actuarial Mathematics  
 Fall 2020 Course Outline

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**Online Learning**

- Learning will be conducted completely online.
- Material will be uploaded to the Illinois Compass 2g Learning Management System (LMS) using the following course space name: Fall 2020-ASRM 533-Risk Management and Regulations-(add section), with the following link: (to be added)
- The course is constituted of 15 modules (Each module is 1 week of instruction) subdivided as follows: (Detailed in Course Calendar)

Module	Dates	Material Uploaded on LMS
Module 0	Monday Aug. 24	1- Course outline
		2- Welcoming Video explaining outline
		Pre-recorded lecture video covering the learning outcomes of the course
	Wednesday Aug. 26	Links to three synchronous zoom office hours to accommodate different time zones (Times to be determined the first week of instruction). Kindly use your real names when entering in the meeting as attendance will be taken. Attendance of one of the above office hours is highly recommended, each according to his/her most convenient time zone.

Modules 1-14	<p>Mondays:</p> <p>Aug. 31, Sep. 7,          Sep. 14, Sep. 21, Sep. 28,          Oct. 5, Oct. 12, Oct. 19,          Oct. 26, Nov. 2, Nov. 9,          Nov. 16, Nov 30, Dec. 7</p>	<p>1- Lecture notes</p> <p>2- Set of 20 minute pre-recorded videos covering the materials in the lecture notes</p> <p>3- HW on the material covered (always due by next Monday at 12:00 pm (CT) except when quizzes and midterms are scheduled. (Please check detailed Calendar at the end of this outline)</p>
	<p>Wednesdays:</p> <p>Sep. 2, Sep. 9, Sep. 16, 2,          Sep. 23, Sep. 30, Oct. 7,          Oct. 14, Oct. 21, Oct. 28,          Nov. 4, Nov. 11, Nov. 18,          Dec 2, Dec. 9</p>	<p>Links to three synchronous zoom office hours to accommodate different time zones (Times to be determined).</p> <p>Attendance of one of the above office hours is highly recommended, each according to his/her most convenient time zone. Kindly use your real names when entering in the meeting as attendance will be taken.</p>

### Notes on Videos and Slides

- The above learning material will be uploaded in the content area, listed in the left hand panel of the Compass course space.
- All videos will be uploaded to the Illinois Media Space and embedded into the Compass course space.
- Office hour zoom meetings will be scheduled and accessible under the zoom meeting button in the left hand panel of the Compass course space.
- All zoom meetings will be recorded live and embedded into Cloud Recordings. However, they won't be uploaded to the Illinois Media Space and hence they are not publicly accessible.

## Additional Engagement Activities

To ensure efficient and timely engagement in the online learning experience students are encouraged to participate and effectively use the following:

**1- Discussion Board:** (Found on the left hand panel of the Compass course space)

In this space, students may ask questions to fellow colleagues and benefit from each other's help. The TA will check the questions weekdays and respond to any unanswered question. The instructor will double check every Monday and provide clarifications either through the forum or by addressing the questions in the next week's lecture.

**2- Announcements:** (Found on the left hand panel of the Compass course space).

Students are encouraged to regularly check the announcements related to uploading new lectures, videos, reminders of exam dates, assignment due dates, changes in scheduled zoom sessions, etc. Note that when announcements are posted, students receive immediately an email notifying them of a new announcement.

**3- Email and Zoom Appointment:** Emails and Zoom appointments are reserved for private and feedback matters. Teaching assistant checks and replies emails on every weekday, while the instructor checks and replies emails on Fridays, Mondays, and Wednesdays evenings. Zoom appointments may be scheduled to discuss private matters and they have to be scheduled by email.

## Course Syllabus

**Description:** This is a general introduction to non-life insurance. The course covers key concepts underlying general insurance practice as data sources, data segregations and aggregation. The student will be able to calculate written, earned, in-force and unearned exposures on a calendar year and a policy year basis. Similarly, premiums are aggregated and brought to current levels using extension of exposure and the parallelogram method. The students will be able to project ultimate claims using development triangles and trending, and perform sensitivity tests to gauge changes in projections due to varying assumptions. Finally students will be able to calculate updated base rates using loss cost method and/or indicated rate changes using loss ratio method. Changes to classification relativities are also covered.

### Textbooks:

Basic Ratemaking Techniques, by Geoff Werner and Claudine Modlin, Actex Publications.

### Supplemental Books:

1-Introduction to Ratemaking and Loss Reserving in Property and Casualty Insurance, R. Brown, W. Scott Lennox

2- Fundamentals of General Insurance Actuarial Analysis, J. Friedland

### Prerequisites:

<b>Course Learning Outcomes</b>
<p><b>I- Important Ratios in General Insurance</b></p> <ul style="list-style-type: none"> <li>a) Define, calculate and interpret major actuarial ratios used in general insurance.</li> <li>b) Use Rate Manuals with preexisting relativities to rate existing coverages.</li> </ul>
<p><b>II-Exposure Aggregation</b></p> <ul style="list-style-type: none"> <li>a) Rate Manuals and premium determination with examples.</li> <li>b) Bases to decide on exposures</li> <li>c) Exposure aggregation (written, earned, unearned and in-force) using calendar year and Policy year</li> <li>d) Exposure aggregation for non-yearly policies.</li> </ul>
<p><b>III-Premium Aggregation</b></p> <ul style="list-style-type: none"> <li>a) Premium Aggregation using (written, earned, unearned and in-force) using calendar and policy year by the extension of exposure and the parallelogram method</li> <li>b) Premium Aggregation using (written, earned, unearned and in-force) for non-yearly policies using calendar and policy year by the extension of exposure and the parallelogram method</li> <li>c) Techniques used to estimate historical premium at current rate level.</li> </ul>
<p><b>IV- Claims Aggregation</b></p> <ul style="list-style-type: none"> <li>a) Define terms such as Claims reported, claims paid, claims reserves, claim's reported date, claim's accident date, claim's calendar date and claim's policy date,.</li> <li>b) Aggregation of claims amount and frequency using calendar year, accident year and policy year.</li> <li>c) Construction of development triangles (Chain Ladder) for both the frequency, severity and pure premium to determine the age to age factors using the average method or the last n-year average or weighted average method.</li> <li>d) Projection of Ultimate losses, ultimate frequency and ultimate pure premium per accident year using</li> </ul>
<p><b>V- Trending for Exposures, premium and frequency</b></p> <ul style="list-style-type: none"> <li>a) Reasons behind the need to trend exposures, frequency and severity</li> <li>b) Determining the date from (of historical data) and date to (for future rating interval) applicable for exposures, premium and frequency trending.</li> <li>c) The one-step and two-step trending methods</li> <li>d) Incorporating trend factors with ultimate claims to estimate ultimate claims fully developed and trended, similarly for on-level premiums fully trended.</li> </ul>
<p><b>VI- Determining New Rates</b></p> <ul style="list-style-type: none"> <li>a) Find indicated rates at a future time using loss cost method</li> <li>b) Find Gross premium by adding Allocated and Unallocated Loss adjustment expenses and underwriting profit margin</li> <li>c) Find general indicated rate change at future time using loss ratio method.</li> <li>d) Find Gross premium by adding ALAE and ULAE and UW profit</li> </ul>

**VII- Determine the revised Relativities**

- a) Revised relativities in view of new Loss Ratios
- b) Off-balance caused by the new relativities
- c) Effect of not balancing off on effective indicated rate change
- d) New base rate after adjustment of off balance relativities.
- e) Completion of project on General Insurance Application

**Online Assessment tools:**

The following table itemizes the assessment tools and their contribution to the final grade of the course:

Type	Format	Due Dates	Correction Due	% of final grade
6 Assignments	PrairieLearn/ exel/R/other	Mondays noon on: Sep. 08, Sep. 14, Sep. 28, Oct 05, Oct. 19, Nov. 02	Friday Evening	6% each, drop lowest Total grade 30%
4 Quizzes (15-20 min)	PrairieLearn/Proctorio/Other	Provisional Dates: Wednesdays Sep. 23, Oct. 28, Nov. 11, Dec. 09	Instantaneous	6% each, drop lowest Total grade 18%
Midterm 1 (1 hour) (closed book, closed notes)	PrairieLearn/Proctorio/Other	Wednesday, October 14, 2020	Wednesday, October 21, 2020	10%
Midterm 2 (closed book, closed notes)	PrairieLearn/Proctorio/Other	Wednesday. November 18, 2020	Wednesday, December 2, 2020	10%
Final (closed book, closed notes)	PrairieLearn/Proctorio/Other	To be determined		20%
Attendance				12%

**Kindly check the detailed calendar to be uploaded to the course Calendar on BlackBoard**

**Notes on Assessment tools:**

- The sample solution of assignments will be uploaded after the due date.
- Any queries of assignment grading are forwarded to the grader.
- There is a 2-day late submission window on assignments with 30% penalty on the final grade of that assignment.
- Discussion is encouraged on assignments but plagiarism is strictly prohibited.
- Makeup quizzes/midterms are not stipulated except in the very rare event of having a major inevitable circumstance hindering the scheduled exam. A written permission must be granted by the instructor for that purpose.
- The coverage of each examination is announced two weeks before the examination.
- Sample solutions of midterms are uploaded after the examination.
- Graded examinations are returned within a week after the examination.
- Queries on exam grading are forwarded to the teaching assistant.

**Final Grade and Letter Grading Scale**

After calculating your grade using the above percentages, the letter grade is obtained according the following mapping:

Final Score	Letter Grade
A+	98% - 100%
A	92% - < 98%
A-	90% - < 92%
B+	88% - < 90%
B	82% - < 88%
B-	80% - < 82%
C+	75% - < 80%
C	70% - < 75%
C-	65% - < 70%
D+	60% - < 65%
D	55% - < 60%
D-	50% - < 55%
F	Below 50

**Academic Integrity Statement**

The University has the responsibility for maintaining academic integrity so as to protect the quality of education and research on our campus and to protect those who depend upon our integrity.

1. Expectations of Students. It is the responsibility of each student to refrain from infractions of academic integrity, from conduct that may lead to suspicion of such infractions, and from conduct that aids others in such infractions. Students have been given notice

of this Part by virtue of its publication. Regardless of whether a student has actually

read this Part, a student is charged with knowledge of it. Ignorance is not a defense.

2. Expectations of Instructors. It is the responsibility of each Instructor to establish and maintain an environment that supports academic integrity. An essential part of each Instructors responsibility is the enforcement of existing standards of academic integrity. If Instructors do not discourage and act upon violations of which they become aware, respect for those standards is undermined. Instructors should provide their students with a clear statement of their expectations concerning academic integrity.

Further details: <https://studentcode.illinois.edu/article1/part4/1-401/>

### **Accommodations Statement**

To obtain disability-related academic adjustments and/or auxiliary aids, students with disabilities must contact the course instructor and the Disability Resources and Educational Services (DRES) as soon as possible. To contact DRES, you may visit 1207 S. Oak St., Champaign, call 333-4603, e-mail [disability@illinois.edu](mailto:disability@illinois.edu) or go to the DRES website. If you are concerned you have a disability-related condition that is impacting your academic progress, there are academic screening appointments available on campus that can help diagnosis a previously undiagnosed disability by visiting the DRES website and selecting “Sign-Up for an Academic Screening” at the bottom of the page.

Further details: <https://www.disability.illinois.edu/>