

University of Illinois at Urbana-Champaign

ASRM 402/STAT 409 Actuarial Statistics II Fall 2020 Course Outline*

Instructor

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Online Learning

- Learning are completely conducted online.
- The learning materials, for both ASRM 402 and STAT 409, are uploaded to the Illinois Compass 2g learning management system, with the course space name:

Fall 2020-ASRM 402-Actuarial Statistics II-Section AL1,

and the link[†]: [https://compass2g.illinois.edu/webapps/blackboard/execute/launcher?type=Course&id=_50965_1&url=.](https://compass2g.illinois.edu/webapps/blackboard/execute/launcher?type=Course&id=_50965_1&url=)

- The course is structured of 15 modules[‡]:
 - Special Module 0:
 - * Dates: August 24 (Monday) – August 26 (Wednesday)[§].
 - * The special module consists of, in chronological order,
 - 1 course outline as of August 22, 2020;
 - 1 set of introductory slides;

*Last updated on August 22, 2020. See the Course Outline, in the left hand panel of the Compass course space, for the most updated version.

[†]NetID with password login is required.

[‡]See the Course Calendar, in the left hand panel of the Compass course space, for the comprehensive schedule of the 15 modules.

[§]All dates and time referenced in this course are in Central Time.

- 2 short lecture videos, with one walking through the course outline and Compass course space, and with another one on the introductory slides providing the bird's-eye view for motivating the concepts in this course;
 - 1 session of office hours on August 25 (Tuesday), to address logistic, technological, and any other concerns for the course.
- Regular Modules 1 – 14:
 - * Each regular module takes 1 week, from Thursdays, to Wednesdays in the following week[¶];
 - * Each regular module consists of, in chronological order,
 - 1 set of lecture notes;
 - 6 – 10 short lecture videos, with each covering a part of the lecture notes;
 - 1 set of tutorial exercises;
 - 1 tutorial video covering the tutorial exercises;
 - 1 session of office hours on Tuesdays;
 - 1 assignment due on Wednesdays at 11:59PM^{||}.
 - The above learning materials of each module are uploaded in each corresponding content area, listed in the left hand panel of the Compass course space.
- All lecture and tutorial videos are
 - pre-recorded, and hence asynchronous;
 - uploaded to the Illinois Media Space and embedded into the Compass course space;
 - compulsory and expected to finish by Mondays at 11:59PM^{**}.
 - All office hours are
 - synchronous, with 3 parallel sessions on Tuesdays at:
 - * 08:00AM – 08:50AM (Section AD1),
 - * 02:00PM – 02:50PM (Section AD2), and
 - * 04:00PM – 04:50PM (Section AD3);
 - compulsory for one of the registered Sections AD1, AD2, and AD3, but are optional for attending more than the registered section;
 - conducted in Zoom Meeting^{††}, in the left hand panel of the Compass course space, which are recorded live and are embedded into Cloud Recordings^{‡‡} in Zoom Meeting.

[¶]The exception is the Module 13, which takes 2 weeks, to incorporate the Thanksgiving Vacation.

^{||}See Online Assessment below for details.

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^{††}Please use your real name, with first and last names, and turn on your camera for proper videoconferencing etiquette. To secure your privacy, feel free to use a virtual background.

^{‡‡}Office Hours Minutes are uploaded on Tuesdays' evening in each module content area for convenient referencing. To help the teaching assistant tag each question's time much easier, please type "verbal question" in the Chat of the Zoom room before you ask any verbal questions. All office hours recordings are unlisted in the Illinois Media Space, and hence are NOT publicly available.

- To ensure engaging online learning experiences, apart from the compulsory registered office hours section, the following 3 online accessibility measures are taken:
 - Announcements, in the left hand panel of the Compass course space:
 - * Important announcements, which are related to learning materials being uploaded, existing learning materials being updated, and reminders for assignment dues and examinations, are posted in the Compass course space.
 - * Right after each new announcement being posted, a copy of the announcement is sent immediately by email.
 - Discussion Board, in the left hand panel of the Compass course space:
 - * Course contents are discussed liberally in the discussion boards among students, who are allowed to post and answer questions.
 - * Please post discussion threads of a module in the corresponding discussion board of the module.
 - * Teaching assistant and grader check and clarify questions on every weekdays' evening, while instructor double checks and clarifies questions on Mondays and Wednesdays evening.
 - Email and Zoom Appointment:
 - * Emails and Zoom appointments are reserved for private and feedback matters.
 - * For easy reference, please use [ASRM 402] or [STAT 409] as the starting of the email subject.
 - * Teaching assistant and grader check and reply emails on every weekdays' evening, while instructor checks and replies emails on Fridays, Mondays, and Wednesdays evening.
 - * Zoom appointments are for effective conversations of private and feedback matters, and are scheduled by email.
- The following technologies are necessary to stay on track throughout the term.
 - Internet connection for everything.
 - * Upload and download speeds can be easily tested by visiting <http://speedtest.net/>.
 - * 50-100 Mbps upload and download speeds are considered fast enough for a single user to watch recordings and stream in a good quality.
 - * Keep in mind that internet usage (especially Netflix and other high bandwidth in services) by others in your home could impact your speeds.
 - Laptop/Tablet, with keyboard and mouse, for
 - * watching asynchronous lecture and tutorial videos;
 - * joining synchronous office hours;

- * receiving and sending emails;
 - * discussing in the Discussion Board;
 - * submitting individual assignments;
 - * attending synchronous examinations.
 - Webcam and microphone for
 - * joining synchronous office hours;
 - * attending synchronous examinations.
 - Camera, such as built-in camera in your smartphone, for submitting individual assignments, if you do not have note writing hardware and software for your laptop/tablet.
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Prerequisite

- ASRM 401/STAT 408 Actuarial Statistics I

About This Course

- This course develops the knowledge of *probability and statistical inferences*, which is foundations of *data science* and *statistical learning*, with tremendous modern *applications on actuarial science*, as well as insurance in general.
- This course corresponds to the *Validation by Educational Experience (VEE)*, *Mathematical Statistics*, of the Society of Actuaries (SOA), and prepares the Section B, Statistics, of the *Modern Actuarial Statistics-I Examination* (Exam MAS-I) by the Casualty Actuarial Society (CAS).

Topics

- *Point Estimation*: (a) Maximum Likelihood Estimation; (b) Method of Moments; (c) Percentile Matching; (d) Properties of Estimators.
- *Confidence Intervals*: (a) Means; (b) Difference of Two Means; (c) Variances; (d) Proportions; (e) Sample Size.
- *Hypothesis Testing*: (a) Type I and Type II Errors; (b) Significance and Power; (c) Neyman–Pearson Lemma; (d) Likelihood Ratio Tests.

Textbooks

- Lecture Notes.
- Tutorial Exercises.

Recommended References

- Hogg, R. V., Tanis, E. A., and Zimmerman, D. L. (2013), *Probability and Statistical Inference*, 9th Edition, Pearson.
 - Hogg, R. V., McKean, J. W., and Craig, A. T. (2018), *Introduction to Mathematical Statistics*, 8th Edition, Pearson.
 - Frees, E. W. (2020), *Loss Data Analytics: An Open Text Authored By The Actuarial Community*, <https://ewfrees.github.io/Loss-Data-Analytics/>.
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Online Assessment

- Assessments are completely conducted online, which include 3 components: individual assignments, examinations, and attendance.
- *Individual Assignments (60%)*:
 - There is a weekly individual assignment which is due on Wednesdays at 11:59PM for each regular module.
 - Only the best 12 assignments, out of all 14 assignments, are counted in the final score, with each sharing 5%.
 - The weekly module assignment is uploaded in each corresponding content area.
 - The solution of the assignment is uploaded in each corresponding content area after the due date.
 - The marked and graded assignment is available in the Compass course space within a week after the due date.
 - Any queries of assignment grading are forwarded to the grader.
 - Unless an unexpected or a special circumstance happens, and a written consent is obtained from the instructor by email before the due date and time, any assignment submissions after the due date and time are not graded.
 - Discussion is strongly encouraged in the discussion boards, but plagiarism is strictly prohibited.
 - Assignments are expected to be finished by a calculator.
- *Examinations (20%)*:
 - There are 3 open-book and open-note examinations, with each midterm examination sharing 5% and the final examination sharing 10%.
 - The examinations are tentatively scheduled on TBA.
 - The time allowed to finish each midterm examination is one hour.
 - The time allowed to finish the final examination is two hours.
 - All examinations are conducted in PrairieLearn and Zoom.
 - The coverage of each examination is announced two weeks before the examination.

- The solution of the examination is uploaded after the examination.
- The marked and graded examination is available in PrairieLearn within a week after the examination.
- Any queries of examination grading are forwarded to the instructor and teaching assistant.
- Unless an unexpected or a special circumstance happens, and a written consent is obtained from the instructor by email before the examination, no make-up or early examination is arranged.
- Examinations are expected to be finished by a calculator.
- *Attendance (20%)*:
 - The attendance for all lecture and tutorial videos are expected and checked.
 - 2% is given to students who finish all lecture and tutorial videos in a particular weekly module by Mondays at 11:59PM^{§§}.
 - Maximum 20% is given to attendance.

Calculator

A calculator is allowed for the individual assignments, the midterm examinations, and the final examination. However, only models BA-35, BA II Plus, BA II Plus Professional, TI-30Xa, TI-30X II (IIS solar or IIB battery), and TI-30XS MultiView (or XB battery), are permitted. Any other models are strictly prohibited.

Final Grade

The final score is calculated based on the formula:

$$60\% \text{ individual assignments} + 20\% \text{ examinations} + 20\% \text{ attendance.}$$

The final grade is then mapped by the following table.

Final Grade	Final Score
A–, A, A+	90 – 100
B–, B, B+	80 – 90
C–, C, C+	65 – 80
D–, D, D+	50 – 65
F	0 – 50

Academic Integrity Statement

The University of Illinois at Urbana-Champaign Student Code should also be considered as a

^{§§}By finishing, this means that every single second of each video is watched without fast-forwarding. To ensure the correct analytics, please watch all lecture and tutorial videos in the Compass course space.

part of this syllabus. Students should pay particular attention to Article 1, Part 4: Academic Integrity. Read the Code at the following URL: <http://studentcode.illinois.edu/>.

Academic dishonesty may result in a failing grade. Every student is expected to review and abide by the Academic Integrity Policy: <http://studentcode.illinois.edu/>. Ignorance is not an excuse for any academic dishonesty. It is your responsibility to read this policy to avoid any misunderstanding. Do not hesitate to ask the instructor if you are ever in doubt about what constitutes plagiarism, cheating, or any other breach of academic integrity.

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 or go to the DRES website.

Emergency Response Statement

Emergency response recommendations can be found at the following website: <https://police.illinois.edu/emergency-preparedness/>. I encourage you to review this website and the campus building floor plans website within the first 10 days of class. <https://police.illinois.edu/emergency-preparedness/building-emergency-action-plans/>

Family Educational Rights and Privacy Act (FERPA) Statement

Any student who has suppressed their directory information pursuant to *Family Educational Rights and Privacy Act* (FERPA) should self-identify to the instructor to ensure protection of the privacy of their attendance in this course. See <https://registrar.illinois.edu/academic-records/ferpa/> for more information on FERPA.

Sexual Misconduct Policy and Reporting Statement

The University of Illinois is committed to combating sexual misconduct. Faculty and staff members are required to report any instances of sexual misconduct to the Universitys Title IX and Disability Office. In turn, an individual with the Title IX and Disability Office will provide information about rights and options, including accommodations, support services, the campus disciplinary process, and law enforcement options.

A list of the designated University employees who, as counselors, confidential advisors, and medical professionals, do not have this reporting responsibility and can maintain confidentiality, can be found here: <https://wecare.illinois.edu/resources/students/#confidential>. Other information about resources and reporting is available here: <https://wecare.illinois.edu/>.