First-Day Information Sheet

Welcome to M339J! Here is some information and some ground rules. I will stick to these rules, and I assume you will, too. Read carefully, and let me know as soon as possible if there is anything unclear.

Treat this document like a contract.

Technicalities

Lectures: MWF 12:00noon-12:50pm at PMA (RLM) 5.116

Office Hours: Mon/Fri 11:00-11:50am and Wed 10:00am-10:50am in PMA (RLM) 13.142

My e-mail: mcudina@math.utexas.edu

Phone numbers: (512)232-6186 (the instructor's office)
(512)471-7711 (Department of Mathematics - main office)

REQUIRED text: "Loss Models: From data to decisions (4th Ed)" by Stuart A. Klugman, Harry H. Panjer, Gordon E. Willmot

About the Course

A few (serious) introductory remarks

⋄ *Canvas.* We will be using the *Canvas* course management system to post grades. Do **not** rely on any total grades that *Canvas* might display. Always calculate your own cumulative scores using the guidelines of this syllabus.

⋄ *Course description.* This course is intended to provide the **mathematical foundations** necessary to prepare for a portion of the SOA exam STAM. The remainder of the STAM curriculum is exhibited in course M349P = M389P (also offered by the Department of Mathematics).

The material exhibited includes: severity- and frequency-of-loss models, compound models, empirical estimation, maximum-likelihood estimation.

⋄ *Learning objectives.*

 ∗ The student will develop understanding the stipulations of common insurance contracts useful in every-day life, including coverage modifications (deductibles, limits, coinsurance).

 ∗ The student will build up the vocabulary and the techniques indispensable in the workplace for every mathematics major focusing on actuarial science.

 ∗ The student will learn to build probabilistic models based on real-life problems with particular focus on short term insurance.

* The student will become competent in choosing appropriate probabilistic models for the applications mentioned above including, but not limited to, parameter value choice.
* The student will become versed in calculating the expected aggregate payments in the presence of coverage modifications for a variety of model choices as the first step towards policy pricing.

◇ *Prerequisites.* M362K and M358K (or M378K) with a grade of C- or better. Informally speaking, a thorough understanding of probability and basic statistics will be needed to advance through the variated and very dense material.

◇ *Drop dates.* The last drop date for this class is the one announced on the academic calendar of the University of Texas at Austin (see `http://registrar.utexas.edu/calendars/`). This term it is April 6th, 2020.

- **A few words about the assignments and grading**

Homework. **This is important information: I will not accept homework that does not conform to the guidelines that follow!**

Homework will be assigned in class and/or available on the course website. The homework will **not** be posted on *Canvas*. You will hand in your homework via online submission of **typed-up** solutions through Canvas. Your solutions need to be in order and you should number the pages.

> The lowest two homework scores will be dropped. The homework assignments and the due dates will be announced as the term progresses.

> Having read and understood this *First-Day Handout* in its entirety will count as one homework assignment. To get the credit, read this entire document with understanding. Then complete the final page of this document and return that page to your instructor by **February 5th, 2020**. Not handing in this assignment does **not** exempt you from abiding by the First-Day Handout.

Quizzes. You should **not** expect to have quizzes and in-class assignments to be completed and handed in during our class meetings. Instead, you will have various warm-up and review worksheets to complete at home. They will all be gathered under the category of *Quizzes* when the final scores are calculated. Please, be vigilant in class to learn about how your quizzes are supposed to be sumbitted and when they are due! You will hand in your quizzes via online submission of **typed-up** solutions through Canvas. Again, your solutions need to be in order and you should number the pages.

> The lowest two quiz scores will be dropped. The homework assignments and the due dates will be announced as the term progresses.

In-Term Exams. These exams will be administered during regular lecture time and will take place in the same classroom. Each exam will focus mostly on the material covered since the previous exam, but it is quite possible that some of the problems will refer to earlier material. Anybody whose average score in **all three in-term** exams is above 90 will get an automatic A and will not be required to take the final exam. To clarify the last point: If you want to be exempt from the final exam, you **must** take all three in-term exams, and the average score of **all three** of them must be above 90%.

The Final Exam. The final exam is going to be comprehensive. That means that any material covered in class or assigned as reading can (and probably will) appear. According to the registrar's office, our final exam will take place on **Wednesday, May 13th (9:00am-12:00noon)**. You should be rechecking this information as the term progresses.

For more information on the **uniform** UT final-examination policy, please consult

http://catalog.utexas.edu/general-information/academic-policies-and-procedures/examinations/

A calculator of any kind *should* be brought to the exams; the following are allowed at CAS/SoA exams: Texas Instruments BA-35, BA II Plus, BA II Plus Professional, TI-30Xa, TI-30X II or TI-30XS Multiview.

These are the things you *must not* to bring to the exams:

  i. books, notes, manuals, anything containing solved problems;
 ii. your own STAM Exam tables (you will get a new copy to use during the exam).

Your scores in all of these will be incorporated into your final grade according to the following scheme:

> *Homework (total after the two lowest scores are dropped):* 10%
> *Quizzes (total after the two lowest scores are dropped):* 10%
> *In-term exams (total):* 50%
> *The final exam:* 30%

In the end, let me caution you that there will be **no make-up in-term exams,** unless you provide me with a written proof that you absence was "legitimate"(e.g., a note from your doctor or your lawyer). In that case you can expect **one and ONLY one** in-term grade dropped and your in-term average calculated based on the remaining two scores. If you miss an in-term exam, you are immediately out of contention for the automatic A based on the in-term average.

The final letter grades will be assigned relative to your numerical score obtained from the above scheme in the following way

$$A \ : 90 - 100$$
$$B \ : 80 - 90$$
$$C \ : 65 - 80$$
$$D \ : 55 - 65$$

> **Your scores are non-negotiable.**

I do not "curve" the grades!!!!!

- **A few bits of friendly advice**

  ◇ *Please, come prepared to every class meeting* – review your notes, pay attention to the current material, and bring the necessary supplies (most importantly – the calculator of your choosing). **Meaningful** class participation will earn you extra credit **at the sole discretion of your instructor.**

  ◇ *Discuss the course with your colleagues* - In order to be able to participate in class, you first need to build up a vocabulary - and there will be a lot of new vocabulary in the beginning. Who better to practice the new concepts with than your classmates who are in the same situation? I suggest that you try to work on homework assignments in pairs and small groups. Of course, you will be required to write up your own final version (and I urge you to do so - that is the only way you will be able to tell what your individual knowledge is, as opposed to the collective knowledge of your study-group).

  ◇ *Don't try to cheat* - This is an unpleasant topic, but unfortunately a necessary one! One is often tempted to stretch the boundaries of mere discussion/collaboration with a fellow student into the territory of pure and simple cheating. In short, everything that you present as your own work (especially the work that is supposed to be graded!) should, in fact, be your own work, and not something copied from an external source. In case that a student is caught in violation of the principles of academic honesty enforced at this university, he/she is immediately reported to the higher authorities and assigned a failing grade in this course. You are expected to have read and understood the current issue of General Information Catalog, published by the Registrars Office, for information about procedures and about what constitutes scholastic dishonesty. Please visit:

  http://deanofstudents.utexas.edu/sjs/acint_student.php.

  ◇ *Get familiar with the required text* - This is advice that everybody gives, but nobody takes, but do try to take a peak into the material we are going to cover in advance. It will make your journey less stressful, and will save you time and energy in the long run.

  ◇ *Have realistic impressions of your performance* - The grading scheme for this course is described above and I do not intend to stray from it. You are solely responsible for keeping a tally of your scores throughout the semester and entering your results in the grading formula above to avoid any surprises at the end of the semester.

  ◇ *On email and office hours* - Email should be used for brief messages about the organization of and current goings on in the course. As a rule, you should first consult the first-day handout to see if your question is answered here. If there is still any ambiguity, contact the instructor. Your instructor is handling a great number of email messages. You should not expect to have your particular email answered in less than 48 hours. You should not be asking mathematical questions via email, since they are incredibly

difficult to answer through a typed message. To get an answer to this type of questions, you should come to office hours and ask in person. When coming to office hours, you should be able to present the mathematical question you have, the route(s) you took in attempting to solve the problem and the obstacles you encountered.

◇ *UT mandated notes*

"Counselling and Mental Health Center Student Services Bldg (SSB), 5th Floor Hours: M–F 8am–5pm

Phone: 512 471 3515

`http://www.cmhc.utexas.edu`"

"The University of Austin provides upon request appropriate academic accommodations for qualified students with disabilities. For more information, contact the Office of the Dean of Students at 471- 6259, 471-6441 TTY or or `http://diversity.utexas.edu/disability/`."

"Religious holy days sometimes conflict with class and examination schedules. Sections 51.911 and 51.925 of the Texas Education Code relate to absences by students and instructors for observance of religious holy days.

Section 51.911 states that a student who misses an examination, work assignment, or other project due to the observance of a religious holy day must be given an opportunity to complete the work missed within a reasonable time after the absence, provided that he or she has properly notified each instructor.

It is the policy of The University of Texas at Austin that the student must notify each instructor at least fourteen days prior to the classes scheduled on dates he or she will be absent to observe a religious holy day. For religious holidays that fall within the first two weeks of the semester, the notice should be given on the first day of the semester. The student may not be penalized for these excused absences but the instructor may appropriately respond if the student fails to complete satisfactorily the missed assignment or examination within a reasonable time after the excused absence."

"This course carries the Quantitative Reasoning flag. Quantitative Reasoning courses are designed to equip you with skills that are necessary for understanding the types of quantitative arguments you will regularly encounter in your adult and professional life. You should therefore expect a substantial portion of your grade to come from your use of quantitative skills to analyze real-world problems."

" Recommendations regarding emergency evacuation from the Office of Campus Safety and Security, 512-471-5767, `http://www.utexas.edu/safety/`:

– Occupants of buildings on The University of Texas at Austin campus are required to evacuate buildings when a fire alarm is activated. Alarm activation or announcement requires exiting and assembling outside.

- Familiarize yourself with all exit doors of each classroom and building you may occupy. Remember that the nearest exit door may not be the one you used when entering the building.

- Link to information regarding emergency evacuation routes and emergency procedures can be found at: `http://www.utexas.edu/emergency/`

- Students requiring assistance in evacuation shall inform their instructor in writing during the first week of class.

- In the event of an evacuation, follow the instruction of faculty or class instructors.

- Do not re-enter a building unless given instructions by the following: Austin Fire Department, The University of Texas at Austin Police Department, or Fire Prevention Services office.

- Behavior Concerns Advice Line (BCAL): 512-232-5050"

This syllabus is subject to modification. Any changes will be announced in class.

- **A <u>TENTATIVE</u> schedule**

			Notes
WEEK 1	Jan 22nd	Orientation. Reading Assignments.	
	Jan 24th	Modelling. Random variables.	-
WEEK 2	Jan 27th	More on sections 2.1-2.	
	Jan 29th	Moments.	
	Jan 31st	Modifications.	
WEEK 3	Feb 3rd	More modifications.	
	Feb 5th	Percentiles.	
	Feb 7th	Generating functions. Heavy tails. Risk measures.	
WEEK 4	Feb 10th	Parametric distributions.	
	Feb 12th	Scale distributions.	-
	Feb 14th	$k-$point mixtures.	-
WEEK 5	Feb 17th	Transformations of distributions.	
	Feb 19th	Mixing distributions.	
	Feb 21st	**In-Term Exam I**	-
WEEK 6	Feb 24th	Mixing distributions[cont'd].	
	Feb 26th	Splicing. Franchise deductibles.	
	Feb 28th	Loss elimination ratio.	-
WEEK 7	Mar 2nd	Coinsurance, deductibles, limits.	
	Mar 4th	Discrete distributions.	
	Mar 6th	The Poisson distribution.	-
WEEK 8	Mar 9th	The negative binomial distribution.	
	Mar 11th	The Poisson-gamma mixture.	
	Mar 13th	The binomial distribution.	
WEEK 9	Mar 23rd	The $(a,b,0)-$class. Modified and truncated distributions.	
	Mar 25th	The effect of deductibles on claim frequency.	
	Mar 27th	Aggregate losses.	
WEEK 10	Mar 30th	**In-Term Exam II**	
	Apr 1st	The compound model for aggregate claims.	-
	Apr 3rd	The compound model for aggregate claims [cont'd].	-
WEEK 11	Apr 6th	Many compound Poissons.	
	Apr 8th	The recursive formula for the distribution of aggregate losses.	
	Apr 10th	Aggregate payments.	-
WEEK 12	Apr 13th	Aggregate payments[cont'd].	
	Apr 15th	The impact of individual policy modifications.	
	Apr 17th	The impact of individual policy modifications[cont'd].	-
WEEK 13	Apr 20th	Maximum Likelihood Estimation (individual, unmodified data).	
	Apr 22nd	Maximum Likelihood Estimation (grouped data).	
	Apr 24th	Maximum Likelihood Estimation (truncated data).	-
WEEK 14	Apr 27th	MLE: Bernoulli. Poison.	
	Apr 29th	MLE: Negative binomial. Binomial.	
	May 1st	Variance and Interval Estimation.	
WEEK 15	May 4th	The delta method.	
	May 6th	**In-Term Exam III**	-
	May 8th	Aftermath	-

I have read and understood
the First-Day Handout
for M339J(unique number: 52920).

Signature

Legibly written: first name, last name, uteid

Date