

The University of Iowa
College of Liberal Arts and Sciences
Fall - 24'

Course Information

Course: STAT:4560:0001 Statistics for Risk Modeling I

Time: 11:30 – 12:20 MWF

Classroom: B60 PBSB (In-Person)

Department: Dept. of Statistics and Actuarial Science - www.stat.uiowa.edu

Course Website: Iowa Courses Online (ICON); access using your Hawk ID and password.

Instructor and Grader Information

Name: Prof. Nariankadu *Shyamalkumar*

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Office Hours: 9:30 – 10:30 MW (Zoom - Meeting ID 964 4905 0520) F (in 233SH)

Grader: Tianrun Wang

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Department Executive Officer

Name: Prof. Kung-Sik Chan

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Course Description and Objectives

This course introduces statistical learning, linear regression, cross-validation, variable selection, regularization, generalized linear models, and some actuarial applications of these models. *Prerequisite:* STAT:4100 Mathematical Statistics I and STAT:4101 Mathematical Statistics II or equivalents with a minimum grade of C+.

This course together with STAT:4561 is approved by the [SOA UEC](#) program for the SOA exam [Statistics for Risk Modeling \(SRM\)](#). The objectives of this course coincide, for the most part, with the first two learning objectives of Exam SRM.

Textbooks, Software & Calculators

Textbook I: *Regression Modeling with Actuarial and Financial Applications*, Edward W. Frees, 2010, New York: Cambridge. ISBN: 978-0521135962.

We will cover the following sections from the above text: Chapter 1 – Background only; Chapter 2 – Sections 1-8; Chapter 3 – Sections 1-5; Chapter 5 – Sections 1-7; Chapter 6 – Sections 1-3; Chapter 11 – Sections 1-6; Chapter 12 – Sections 1-4; Chapter 13 – Sections 1-6.

Textbook II: *An Introduction to Statistical Learning, with Applications in R*, James, Witten, Hastie, Tibshirani, 2021, New York: Springer.

We will cover the following sections from *An Introduction to Statistical Learning*: Chapter 2 – Sections 1-3; Chapter 3 – Sections 1-6; Chapter 5 – Sections 1 and 3 (excluding 5.3.4); Chapter 6 – Sections 1-5.

Table 1: Tentative Schedule

Week	Topic	Text I	Text II
1	Statistical Learning		2.1-2.3
2	Simple Linear Regression	2.1-2.8	3.1; 3.6.1-2
3	Quiz 1; Simple Linear Regression	2.1-2.8	3.1; 3.6.1-2
4	Multiple Regression	3.1-3.5	3.2-3.6
5	Quiz 2; Multiple Regression	3.1-3.5	3.2-3.6
6	Multiple Regression	3.1-3.5	3.2-3.6
7	Quiz 3; Midterm; Review	-	-
8	Midterm; Cross-Validation		5.1,5.3
9	Variable Selection	5.1-5.7	6.1
10	Variable Selection	6.1-6.3	6.1
11	Regularization		6.2-6.5
12	Quiz 4; Categorical Dependent Variables	11.1-11.6	-
13	Count Dependent Variables	12.1-12.4	
14	GLM	13.1-13.6	
15	GLM	13.1-13.6	

Calculator: You will be expected to have an SOA/CAS-approved calculator available during the exams. Calculators not approved by CAS/SOA will not be allowed.

Course Materials

This course will post lecture notes and other documents on the course website at icon.uiowa.edu.

Evaluation

Class Attendance

Attendance is not mandatory. It must be said, though, that absentees who are frequently absent cannot expect the instructor to help them make up the missed material during office hours or by email.

Assignments - 20%

The assignments will mostly be given on Fridays and are expected to be turned in by the following Saturday at midnight. Assignments need to be scanned and uploaded on ICON so as to maintain a complete record of the grading, especially with this being a UEC course. Since I give an extra day of Saturday for submission, late assignments will **not** be accepted for any reason.

Biweekly Quizzes - 15%

Seven quizzes will be given - typically on Mondays - on 9/9, 9/23, 10/7, 10/28, 11/11, 11/22 (**Friday**), and 12/9. The lowest score will be dropped for grading purposes. Hence, missed quizzes will not be made up for any reason.

Midterm Exam- 25%

This is a closed-book 90-minute evening exam scheduled for 10/16/24 at 6:30-8:00 pm in 109 EPB. The exam will consist of SOA Exam-SRM-style questions but set as a written answer exam instead of as a multiple choice one.

Final Exam - 40%

This is a closed-book 2-hour exam consisting of SOA Exam-SRM-style questions but set as a written answer exam instead of as a multiple choice one. It will be scheduled during the final exam week. The sample exam questions (with solutions) provided by the SOA [here](#) are good practice for the final.

Missed Exams

Missed exams can be made up only for university-approved reasons, and unless the reason prohibits advanced notice, the student must provide the instructor with the required documentation with sufficient advance notice. In the case of illness, the student should inform the instructor by the end of the day of the exam unless the severity of the illness does not permit it.

Scoring for SOA UEC Credit

To determine the UEC credit, the performance on this course's and STAT:4561's final and assignments will be taken into account. In each course, the final comprises 80% of its UEC score, and the assignment comprises the remaining 20%. A minimum UEC score of 85% is required in each of STAT:4560 and STAT:4561 to obtain the UEC credit for SOA Exam SRM.

Grade Scale for U of Iowa Course Final Grade

Final grades will be assigned according to the following tentative scale:

As	85 – 100
Bs	70 – 84
Cs	55 – 69
Ds	40 – 54
Fs	0 – 39

The plus/minus grades will be used, and an A+ may be awarded to the top performer in the class who also contributes significantly to the in-class discussions. The exact scale will likely differ between undergraduate and graduate students, with the undergraduate scale resulting in an equal or higher letter grade for the same cumulative score.

Academic Honesty and Misconduct

All students in CLAS courses are expected to abide by the [CLAS Code of Academic Honesty](#). Undergraduate academic misconduct must be reported by instructors to CLAS according to [these procedures](#). Graduate academic misconduct must be reported to the Graduate College according to Section F of the [Graduate College Manual](#).

Student Complaints

Students with a complaint about a grade or a related matter should first discuss the situation with the instructor and/or the course supervisor (if applicable), and finally with the Director or Chair of the school, department, or program offering the course.

Undergraduate students should contact [CLAS Undergraduate Programs](#) for support when the matter is not resolved at the previous level. Graduate students should contact the CLAS [Associate Dean for Graduate Education and Outreach and Engagement](#) when additional support is needed.

Drop Deadline for this Course

You may drop an individual course before the deadline; after this deadline you will need collegiate approval. You can look up the [drop deadline for this course](#) here. When you drop a course, a “W” will appear on your transcript. The mark of “W” is a neutral mark that does not affect your GPA. Directions for adding or dropping a course and other registration changes can be found on the [Registrar's website](#). Undergraduate students can find policies on dropping CLAS courses [here](#). Graduate students should adhere to the [academic deadlines](#) and policies set by the Graduate College.

Date and Time of the Final Exam

The [final examination date and time](#) will be announced by the Registrar generally by the fifth week of classes and it will be announced on the course ICON site once it is known. **Do not plan your end of the semester travel plans until the final exam schedule is made public. It is your responsibility to know the date, time, and place of the final exam.** According to Registrar's final exam policy, students **have a maximum of two weeks after the announced final exam schedule** to request a change if an exam conflict exists or if a student has more than two exams in one day (see the [policy](#) here).

Attendance and Absences

Students with UI-authorized activities must discuss their absences with the instructor as soon as possible. Religious obligations must be communicated within the first three weeks of classes.

Communication: UI Email

Students are responsible for all official correspondences sent to their UI email address (uiowa.edu) and must use this address for any communication with instructors or staff in the UI community. For the privacy and the protection of student records, UI faculty and staff can only correspond with UI email addresses.

Mental Health Resources and Student Support

Students are encouraged to be mindful of their mental health and seek help as a preventive measure or if feeling overwhelmed and/or struggling to meet course expectations. Students are encouraged to talk to their instructor for assistance with specific class-related concerns. For additional support and counseling, students are encouraged to contact University Counseling Service (UCS). Information about UCS, including resources and how to schedule an appointment, can be found at counseling.uiowa.edu. Find out more about UI mental health services at mentalhealth.uiowa.edu.

[Student Care and Assistance](#) provides assistance to University of Iowa students who are experiencing a variety of crisis and emergency situations, including but not limited to medical issues, family emergencies, unexpected challenges, and sourcing basic needs such as food and shelter. More information on the resources related to basic needs can be found at basicneeds.uiowa.edu/resources/. Students are encouraged to contact Student Care & Assistance in the Office of the Dean of Students (Room 135 IMU, dos-assistance@uiowa.edu, or 319-335-1162) for support and assistance with resources.

University Policies

Accommodations for Students with Disabilities

The University is committed to providing an educational experience that is accessible to all. If a student has a diagnosed disability or other disabling condition that may impact the student's ability to complete the course requirements as stated in the syllabus, the student may seek accommodations through [Student Disability Services](#) (SDS). SDS is responsible for making Letters of Accommodation (LOA) available. **The student must provide an LOA to the instructor as early in the semester as possible, but requests not made at least two weeks prior to the scheduled activity for which an accommodation is sought may not be accommodated.** The LOA will specify what reasonable course accommodations the student is eligible for and those the instructor should provide. Additional information can be found on the [SDS website](#).

Free Speech and Expression

Absences for Religious Holy Days

Classroom Expectations

Non-discrimination

Sexual Harassment/Misconduct and Supportive Measures

Sharing of Class Recordings (if appropriate)