

STAT 490: Data Science for Actuarial Science

Meets: Thursday from 4:30 to 5:20 in WALC 2007

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Office Hours: Tuesday 9:00 to 10:00 in Hillenbrand
Wednesday 1:30 to 3:30 in Hillenbrand
Thursday 5:30 to 6:30 in WALC 2007

or by appointment

General Information

The Learning Objectives for this course are:

- Understand the application of Data Science to an Actuarial Science Case Study
- Understand data quality issues and be able to identify common data errors
- Apply techniques to data to identify and fix data errors
- Understand data visualization techniques and apply those techniques to the data
- Use R, Excel, and other tools and techniques to analyze the data
- Use various data analytic techniques on the data and identify previously unidentified relationships
- Learn the uses of mortality and lapse studies
- Apply appropriate techniques to measure decrements (death or lapse) and the associated exposure for each cell being evaluated
- Understand how to and be able to write a professional report
- Develop presentation skills for a professional setting
- Understand the Actuarial Standards of Practice applicable to this work

Textbook: No Textbook is required for this course.

Confidentiality – You will be working with data provided to our class by an insurance company. This data is CONFIDENTIAL. You will be asked to sign a confidentiality agreement. Additionally, you will need to complete certain standardized on-line training provided by Purdue for all students who work with confidential data.

Computing Devices

The student is expected to have a computing device that can be used for data analysis. This computing device should be brought to class each class period.

Procedures

Evaluation will be based on a combination of attendance, group participation, quizzes, homework assignments, a final written report, and the class ending presentation.

There will be 8 quizzes during the semester. Quizzes will be announced. The lowest quiz grade will be dropped and disregarded.

Each student will be assigned to a group. Each group will consist of five or six students. You will work with the same group of students all semester to complete our Data Analysis. Each week, your group will be assigned specific tasks to be completed during the week. It is expected that your group will work together to completed these tasks. During the semester you will complete both self-evaluations and group evaluations which will be used to assign a grade.

You are expected to attend all the classes. Attendance will be taken at each class. To receive attendance points, you must be present for all 50 minutes of the class.

At the end of the class, our class will present a written report detailing our findings to the insurance company who provided the data. Additionally, our class will make a professional presentation which summarizes our findings to the actuaries from that company.

Final grades will be based on the following weights:

Attendance	16%
Quizzes	28%
Homework	12%
Group Participation	20%
Written Report	12%
Presentation	12%
Total	100%

Grades

Grades will be on a plus/minus scale as follows:

Score	Grade
99.5% and above	A+
94-99.4	A
90-93.9	A-
87-89.9	B+
83-86.9	B
80-82.9	B-
77-79.9	C+
73-76.9	C
70-72.9	C-
67-69.9	D+
63-66.9	D
60-62.9	D-
59.9 and below	F

Cheating

- **Academic Dishonesty will not be tolerated!**
- **If you cheat on a Quiz, the penalty is a zero on the Quiz and you will lose 5% of the total score for the class. The score of zero will not be dropped.**

Purdue has a student-initiated Purdue Honors Pledge:

“As a boilermaker pursuing academic excellence, I pledge to be honest and true in all that I do. Accountable together - we are Purdue.”

You will be asked to sign this pledge for each quiz.

Students can report issues of academic integrity that they observe, either through the Office of the Dean of Students (purdue.edu/odos), call 765-494-8778 or email integrity@purdue.edu .

Academic Adjustments

In this course, accommodations are managed between the instructor, the student and the DRC Testing Center.

Students should see me before or after class or during office hours to share your Accommodation Memorandum for the current semester and discuss your accommodations as soon as possible.

Class Structure

Students are expected to complete a series of assignments outside the classroom between each class. It is anticipated that you will spend about 3 to 4 hours each week outside of class working on this class. Students will have a series of videos, assigned readings, and exercises to complete each week. The quizzes in class will be to verify that the out of class work has been completed.

Additionally, you will be working with the data upon which this class is based. Each group will be assigned certain data analysis tasks each week. Those are to be completed prior to the class.

During class time, we will discuss the data analysis that you completed last week. Each group will share their findings and we will all learn from this process. Additionally, we will discuss the tasks to be completed during the next week. This will also be a time for questions on the videos, assigned readings, and exercises that were completed during the prior week.

I, as well as the Teaching Assistants for this class, will hold office hours in Hillenbrand each week. This will allow you or each group to seek help in understanding the material or more importantly in completing the Data Analysis tasks assigned for the week. Please see the first page for office hours. **TAKE ADVANTAGE OF THESE RESOURCES.** If you do not, it is doubtful that you will be successful in this class.

Course Outline

May 9, 2019

While this outline tries to be complete and accurate, there will be changes in the schedule of the course; these will be announced in class and on the class website.

Date	Subject Matter	Assignments
August 22	Introduction	
August 29	Mortality and Lapse Studies	
September 5	Mortality and Lapse Studies	
September 12	Data Validation	
September 19	Data Validation	
September 26*	Data Cleansing	
October 3	Data Cleansing	
October 10	Data Visualization	
October 17	Data Visualization	
October 24	Initial Results	
October 31*	Intermediate Results	
November 7	Final Results	
November 14	Data Fitting and Analysis	
November 21*	Data Fitting and Analysis	
December 5	Report Writing/Presentation	
December 9*	Presentation to Company 8:00 to 10:00 am	WTHR 104

Copyright

In general, notes are “considered to be ‘derivative works’ of the instructor's presentations and materials, and they are thus subject to the instructor's copyright in such presentations and materials.” I consider class notes, tests, and quizzes to be derivative works and therefore copyrighted. Class notes, tests, and quizzes may not be sold, bartered, or even given to websites or other resources. Examples of such websites are Course Hero, Chegg, or Quizlet.

CAPS Information

Purdue University is committed to advancing the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of support, services are available. For help, such individuals should contact Counseling and Psychological Services (CAPS) at (765)494-6995 and <http://www.purdue.edu/caps/> during and after hours, on weekends and holidays, or through its counselors physically located in the Purdue University Student Health Center (PUSH) during business hours.