

# **STAT 490: Data Science for Actuarial Science**

**Fall 2022**

Meets: Tuesday from 1:30 to 2:20 in UNIV 019

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Office Hours:

Tuesday 10:00 am to 11:30 am

Thursday 10:00 am to 11:30 am

or by appointment

**Please check email daily as this is the method that I will use to communicate with you.**

## **Expectations**

**For each hour of class, you will spend 2 to 3 hours outside of class working on this class.**

## **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
- 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.

## **Class Structure**

This is an in-person class. You are expected to attend each class in person and are strongly encouraged to attend class provided that you are healthy. However, if you are not healthy, you should NOT attend class. Please be considerate of your classmates (and me).

Lectures will NOT be recorded. If you are unable to make it to class, then you will need to get notes from one of your classmates.

As mentioned below, all homework for this class will be provided on the class website. You will submit your homework in Brightspace.

The process for tests and quizzes will be discussed below.

## **Classroom Procedures**

### ***Attendance***

This course follows Purdue's academic regulations regarding attendance, which states that students are expected to be present for every meeting of the classes in which they are enrolled. Attendance will be taken at the beginning of each class and lateness will be noted. When conflicts or absences can be anticipated, such as for many University-sponsored activities and religious observations, the student should inform the instructor of the situation as far in advance as possible. For unanticipated or emergency absences when advance notification to the instructor is not possible, the student should contact the instructor as soon as possible by email or phone. When the student is unable to make direct contact with the instructor and is unable to leave word with the instructor's department because of circumstances beyond the student's control, and in cases falling under excused absence regulations, the student or the student's representative should contact or go to the Office of the Dean of Students (ODOS) website to complete appropriate forms for instructor notification. Under academic regulations, excused absences may be granted by ODOS for cases of grief/bereavement, military service, jury duty, parenting leave, or emergent or urgent care medical care.

If you must miss class at any point in time during the semester, please reach out to me via Purdue email so that we can communicate about how you can maintain your academic progress. For COVID-19 concerns, please see the Fall 2022: What you need to know guidance published July 27. If you find yourself too sick to progress in the course, notify your adviser and notify me via email or Brightspace. We will make arrangements based on your particular situation.

## Procedures

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

You will earn 1 point for each class that you attend. If you attend 12 out of 14 classes, you get full credit. If you attend every class, you get 14 out of 12 points.

There will be 6 quizzes during the semester. Quizzes are listed below in the schedule. The lowest quiz grade will be dropped and disregarded.

At the end of the class, you will write a written report on your findings. Additionally, you will make a professional presentation which summarizes your findings to the class.

Final grades will be based on the following weights:

Attendance	12%
Quizzes	25%
Homework	33%
Written Report	15%
Presentation	15%
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](http://purdue.edu/odos)), call 765-494-8778 or email [integrity@purdue.edu](mailto: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.

## Course Outline

September 6, 2022

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 23	Introduction	
August 30	Data Validation	Prior to class on August 30, Read and familiarize yourself with Actuarial Standard of Practice 23 (ASOP 23) which is available on the class website. The applicable pages are pages 1-7.
September 6	Data Cleansing, Quiz 1	See link on website
September 13	Claims Reserves	See link on website
September 20	Claims Reserves, Quiz 2	
September 27	Data Visualization	
October 4	Data Visualization, Quiz 3	
October 11	Fall Break	
October 18	Pricing, Quiz 4	
October 25	Discussion of Individual Projects	
November 1	No Class	
November 8	Work on Individual Projects	
November 15	Report Writing, Quiz 5	
November 22	Presentations	
November 29	Report Writing, Quiz 6	
December 6	Report Writing	
December 13	Presentations	8:00 am to 10:00 am, MTHW 304

## 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.

## Nondiscrimination Statement

Purdue University is committed to maintaining a community which recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her own potential. In pursuit of its goal of academic excellence, the University seeks to develop and nurture diversity. The University believes that diversity among its many members strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life.

## Mental Health Statement

**If you find yourself beginning to feel some stress, anxiety and/or feeling slightly overwhelmed, try [WellTrack](#).** Sign in and find information and tools at your fingertips, available to you at any time.

**If you need support and information about options and resources,** please contact or see the [Office of the Dean of Students](#). Normal drop-in hours are M-F, 8 am- 5 pm.

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.

## Emergency Preparation

A link to Purdue’s Emergency Preparedness resources is:

[https://www.purdue.edu/ehps/emergency\\_preparedness/](https://www.purdue.edu/ehps/emergency_preparedness/)

You are strongly encourage to review these procedures.

There are emergency procedures outlined in the attachment.

## **Violent Behavior Policy**

Purdue University is committed to providing a safe and secure campus environment for members of the university community. Purdue strives to create an educational environment for students and a work environment for employees that promote educational and career goals. Violent Behavior impedes such goals. Therefore, Violent Behavior is prohibited in or on any University Facility or while participating in any university activity. See our course Brightspace under University Policies for a link to the full Violent Behavior Policy.

## **Diversity & Inclusion Statement**

In our discussions, structured and unstructured, we will explore a variety of challenging issues, which can help us enhance our understanding of different experiences and perspectives. This can be challenging, but in overcoming these challenges we find the greatest rewards. While we will design guidelines as a group, everyone should remember the following points:

- We are all in the process of learning about others and their experiences. Please speak with me, anonymously if needed, if something has made you uncomfortable.
- Intention and impact are not always aligned, and we should respect the impact something may have on someone even if it was not the speaker's intention.
- We all come to the class with a variety of experiences and a range of expertise, we should respect these in others while critically examining them in ourselves.

## **Basic Needs Security**

Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact the Dean of Students for support. There is no appointment needed and Student Support Services is available to serve students from 8:00 – 5:00, Monday through Friday. Considering the significant disruptions caused by the current global crisis as it related to COVID-19, students may submit requests for emergency funds. Click [here](#) for details and the request form.