

Time Series Applications

Spring 2025 Block 5

Instructor


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Class Meetings

January 13th to February 5th

 9:00 am - 11:00 am and 1:00 pm - 3:00 pm

 West 201

Office Hours

 MWTh 3:05pm-4:05pm and by appt.

 West 311

 [Optional Appointment](#)

You Are A Priority

My goal for this block is to help you learn the material. I want to first and foremost recognize that you are an individual and thus are unique and may learn uniquely. Additionally, your health and well-being are priority one. Learning cannot happen effectively if you don't meet your other personal needs. That all being said, I have structured the class in a way that I, from experience teaching and learning myself, think will be most beneficial for most students. I promise to do my best to create an inclusive and engaging learning environment. I ask that you keep an open line of communication between us when you need help and/or flexibility. You and your learning are why I am here.

Course Description

Time series analysis is a vital tool for investigating data from many fields, such as business, economics, engineering, biology, medicine, social sciences, and politics. Understanding and anticipating a variable's change over time is valuable. This class will cover an array of time series methods, including those for correlation analysis and forecasting, stochastic models, regression analysis with time-related variables, and stationary/nonstationary models.

Learning Objectives

This course supports the Educational Priorities and Outcomes of Cornell College, emphasizing knowledge, communication, and reasoning. Specifically, the learning objectives of this course are:

- Ability to communicate statistical ideas clearly and accurately (communication).
- Understand what a time series is (knowledge, reasoning).
- Understand forecasting strategies (knowledge, reasoning).
- Understand regression with time-related variables (knowledge, reasoning).
- Learn and apply some advanced time series methods (knowledge, reasoning).
- Ability to ascertain which type of analysis is appropriate for a particular data set and question (reasoning, ethical behavior).
- Become more adept at following the statistical process of starting with a question, collecting the requisite data, analyzing the data, and reporting on the results (reasoning, communication).

Prerequisite

To be successful in this class, you should have completed STA 201 and STA 202.

Open Access Books – Free!

All of the materials for this class are free.

The textbook is: [Forecasting: Principles and Practice](#) by Rob J Hyndman and George Athanassopoulos – it is freely available online. Chapters 1-8.

Course Site and Moodle

Our course will run from a combination of [Moodle](#) and the course website at https://stats-tgeorge.github.io/STA363_AdvReg/.

Software – No need to install

In this course, we will use a combination of technologies, including R and RStudio (server). I have set up an RStudio server that you will access with a web browser. You don't need to install any software (in fact, for a while, I prefer you don't). If you are an off-campus student, please let me know right away.

You can access the RStudio Server at: <http://turing.cornellcollege.edu:8787/>.

If you have any technical problems you should contact IT as soon as possible.
[Submit a Work Order!](#)

Evaluations and grades

You will find your grades in the course [Moodle Gradebook](#).

Grade Category Descriptions

Homework:

Your homework will be graded for correctness. I will generally evaluate a random subset of the assigned questions. Your goal is to practice the application of the method and be able to interpret the result. You will find your homework and due dates on the course website's homepage.

Participation

This will be measured by your class attendance and your work on labs and class examples. With class work, please save your script files in the folder provided on the RServer. I will look at these files to see if you are following along and participating.

Project

Your project will entail multiple submission stages with details accessed through “Project” on the left side of the course website (once available). Some class time will be used for discussing projects, but not enough to complete the project. I do not anticipate we will start these until week 3. You must use time series analysis and write a scrollytelling article about your results. If you have never heard of scrollytelling, check out [this NYT article](#) and this [shorthand website](#).

Exams

You will have two exams this block, 1/24 and 2/4-2/5. Each exam will have two components. Component 1 will be on these dates and be in a written format. Component 2 will be a take-home, open-book, open-note, exam that you will have 12 hours or more to complete.

| Assignment | Points |
|-------------------------|--------|
| Homework | 300 |
| Participation | 100 |
| Project | 200 |
| Exams, two 200pts exams | 400 |
| Total | 1000 |

| Grade | Range | Grade | Range |
|-------|---------|-------|--------|
| A | 93-100% | C | 73-76% |
| A- | 90-92% | C- | 70-72% |
| B+ | 87-89% | D+ | 67-69% |
| B | 83-86% | D | 63-66% |
| B- | 80-82% | D- | 60-62% |
| C+ | 77-79% | F | <60% |

AI Policy

The beta release of Dall-E-Mini in July 2022 and ChatGPT in November 2022 are among many tools using artificial intelligence. It is likely that using tools like these will become an important skill for careers in the not-too-distant future (<https://www.theguardian.com/commentisfree/2023/jan/07/chatgpt-bot-excel-ai-chatbot-tech>).

In the meantime, though, society will have to figure out when using these tools is acceptable.

Work created by AI tools may not be considered original work and, instead, considered automated plagiarism. It is derived from previously created texts from other sources the models were trained on, yet doesn't cite sources. AI models have built-in biases (ie, they are trained on limited underlying sources; they reproduce, rather than challenge, errors in the sources) AI tools have limitations (ie, they lack critical thinking to evaluate and reflect on criteria; they lack deductive reasoning to make judgments with incomplete information at hand; they make up or use inaccurate information and may "hallucinate" sources that do not exist)

In this course, all informal writing should be written without AI. The purpose of informal writing is to help you think through your ideas, connect with your lived experiences, and figure out your thoughts and opinions. Using AI here subverts that process.

A final note: Other courses may have different AI policies, and it is important to be aware of each class's policy.

DISABILITIES AND ACCOMMODATIONS POLICY

Cornell College makes reasonable accommodations for persons with disabilities. Students should notify the Office of Academic Support and Advising and their course instructor of any disability-related accommodations within the first three days of the term for which the accommodations are required due to the fast pace of the block format. For more [information on the documentation required to establish the need for accommodations and the process of requesting the accommodations](#).

ACADEMIC HONESTY POLICY

Cornell College expects all members of the Cornell community to act with academic integrity. An important aspect of academic integrity is respecting the work of others. A student is expected to explicitly acknowledge ideas, claims, observations, or data of others, unless generally known. When a piece of work is submitted for credit, a student is asserting that the submission is her or his work unless there is a citation of a specific source. If there is no appropriate acknowledgment of sources, whether intended or not, this may constitute a violation of the College's requirement for honesty in academic work and may be treated as a case of academic

dishonesty. The procedures regarding how the College deals with cases of academic dishonesty appear in The Catalog, under the heading “Academic Honesty.”

Illness Policy

If you become unable to attend class for any other health reason, contact me as soon as possible.

Mandatory Reporter Reminder

It is my goal that you feel supported and able to share information related to your life experiences during classroom discussions, in your written work, and in any one-on-one meetings with me. You should also know that all Cornell College faculty and staff are mandatory reporters. This means that I will keep information you share with me private to the greatest extent possible. However, I am required to share information regarding sexual assault, abuse, criminal behavior, or about a student who may be a danger to themselves or to others. If you wish to speak to someone confidentially who is not a mandatory reporter, you can schedule an appointment with one of the counselors in the Ebersole Health and Wellbeing Center or contact the College Chaplain, Rev. Melea White, at mwhite@cornellcollege.edu.