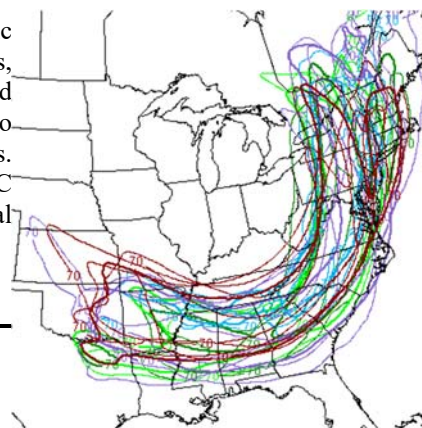


# METEOROLOGICAL STATISTICS

## ATMS 405

### SPRING 2021

The applications of various statistical methods pervade the atmospheric sciences. From simple descriptive techniques to more complex analyses, meteorologists and climatologists routinely rely on statistical methods and procedures to draw conclusions about physical processes in the atmosphere, to analyze historical data, to forecast the weather, and to verify those forecasts. No matter what you plan to accomplish after you earn your degree from UNC Asheville, you will certainly benefit from a broad knowledge of the statistical methods used in the atmospheric sciences.




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#### PROFESSOR

Dr. Christopher Godfrey

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Office hours: Via virtual meetings through Google Hangouts on **Mondays 9:30–10:45 a.m.** and on **Thursdays 2:00–4:00 p.m.** or by appointment. You may call my office (it bounces to my cell phone) during regular business hours. You may send me as many email messages as you wish. Check Moodle for the Google Hangouts link.

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#### CLASS INFORMATION

Meeting times: This is an asynchronous online course, though you are welcome to drop in and ask questions during any of my office hours. All lectures are posted by topic and date and are available via Moodle. Please be sure to keep up with the course schedule.

Location: Online via Moodle (<http://learnonline.unca.edu>)

Required text: Wilks, D. S., 2011: *Statistical Methods in the Atmospheric Sciences*. 3rd ed. Academic Press, 676 pp.

Website: <http://www.atms.unca.edu/cgodfrey/courses/atms405/>

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#### GETTING QUESTIONS ANSWERED

I will be available on Google Hangouts during scheduled office hours. Just drop in. If at any other time you have a question, you are more than welcome to call me or send me an email. E-mail is by far the best way to reach me and you will usually get a speedy reply. You may also schedule an appointment with me for a virtual meeting. Please don't hesitate to ask questions whenever the need arises.

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#### IMPORTANT DATES

Monday, 8 March 2021	Midterm Exam	3:30–4:45 p.m.
Friday, 30 April 2021	Final Exam	3:00–5:30 p.m.

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#### COURSE OUTLINE

This course outline is approximate, but the list of topics and corresponding book sections serves as an excellent schedule of reading assignments.

Date	Topic	Reading
20 January	Introduction, Probability	Chapter 1
25 January	Probability	Chapter 2
27 January	Probability	Chapter 2
1 February	Exploratory data analysis, Organizing data	3.1–3.2
3 February	Exploratory data analysis, Organizing data	3.3–3.4, except 3.3.6
8 February	Exploratory data analysis, Organizing data	3.3–3.4, except 3.3.6
10 February	Correlation	3.5–3.6
15 February	Discrete distributions	4.1–4.3
17 February	Discrete distributions	4.1–4.3
22 February	Continuous distributions	4.4–4.5
24 February	Continuous distributions	4.4–4.5

1 March	Sampling distributions, Testing	5.1
3 March	Parametric tests	5.2
8 March	<b>Midterm Exam</b>	
10 March	<b>Break–No Class</b>	
15 March	Mid-term review	
17 March	Parametric tests	5.2
22 March	Nonparametric tests	5.3
24 March	Nonparametric tests	5.3
29 March	Field significance, False discovery rate	5.4
31 March	Least squares regression	7.1–7.2
5 April	Least squares regression	7.4
7 April	Classical statistical forecasting, MOS, Perfect prog	7.3.2, 7.5
12 April	Ensemble forecasting	7.6-7.7
14 April	Ensemble forecasting, Subjective probability forecasting	7.8
19 April	Forecast verification (nonprobabilistic)	8.1–8.3
21 April	Forecast verification (probabilistic)	8.4–8.5
26 April	Forecast verification (field, ensemble)	8.6, 8.7
30 April	<b>Final Exam</b>	3:00–5:30 p.m.

## EVALUATION

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There will be homework assignments, one midterm exam, and one comprehensive final exam to assess your newfound knowledge of statistics. Expect about eight homework assignments, which will be due every one to two weeks as we make sufficient progress through the course. Homework is due at exactly 5:00 p.m. on the scheduled due date. Please plan accordingly. I will accept homework up to 24 hours late (5:00 p.m. the following calendar day) for a 50% late penalty. Homework more than 24 hours late will not be graded.

## GRADING

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Homework Assignments	50%
Midterm Exam	25%
Final Exam	25%

I reserve the option to curve the final grades upward at my discretion. In fact, it is highly likely that I will do so by applying statistical techniques. I also reserve the right to adjust the percentages shown here, but only if doing so would benefit the class as a whole.

## ACADEMIC INTEGRITY

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Since the point of this or any class is to learn, you may collaborate on homework assignments, but *you absolutely must make sure that you hand in your own work.* If you choose to use a data analysis package, such as Excel, then you may not share worksheets. Please enter any necessary data and formulae and create charts on your own. Copying your friend's answers will not only be obvious to me, but will result in both of you sharing the credit for that answer. For example, if you do a fantastic job on the homework assignment and then let three of your friends copy *any part of it*, you will each receive a maximum grade of 25% for the assignment. The midterm and final exams are open book and open notes, but you may not consult classmates or use your phone, supplemental materials, or the Internet.

## NOTES

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Students with disabilities who require accommodations in this course are requested to speak with the professor as early in the semester as possible. Students requiring reasonable accommodations must register with the Office of Academic Accessibility by providing supporting documentation. The Office of Academic Accessibility is located in the OneStop Student Services Center, 011 Ramsey Library, phone (828) 232-5050.

## FURTHER NOTES

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- Those who are graduating this semester may not take the final exam at a different time.
- Some homework problems will require plots or analyses that a program or software package may handle best. You are welcome to learn and use any available package or programming language (e.g., Excel, Python, Matlab, RStudio, SAS, etc.). See [https://en.wikipedia.org/wiki/List\\_of\\_statistical\\_packages](https://en.wikipedia.org/wiki/List_of_statistical_packages) for a comprehensive list of options.