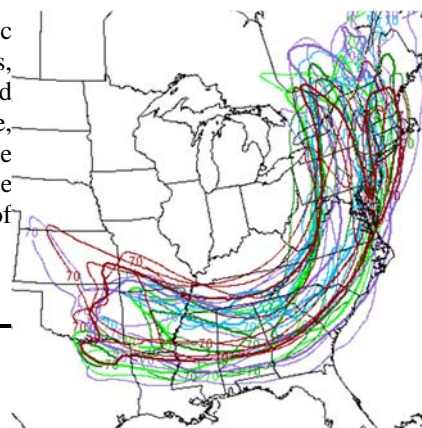


# METEOROLOGICAL STATISTICS

## ATMS 405

### SPRING 2017

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

Office: Robinson Hall, room 231

Phone: 828-232-5160

E-mail: cgodfrey at unca dot edu

Office hours: 2:00 p.m. to 3:00 p.m. on Mondays and Wednesdays, or by appointment. If my door is open at any other time, please drop in.

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#### CLASS INFORMATION

Meeting times: MW 3:30–4:45 p.m.

Location: Robinson Hall, room 239

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 in my office during scheduled office hours, but if at any other time you have a question and my office door is open, you are more than welcome to visit. Otherwise, e-mail is by far the best way to reach me. You may also schedule an appointment with me. Please don't hesitate to ask questions inside or outside of a classroom setting.

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#### IMPORTANT DATES

Wednesday, 8 March 2017

Mid-term Exam

In class

Friday, 5 May 2017

Final Exam

3:00–5:30 p.m.

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#### COURSE OUTLINE

This course outline is subject to modifications, but this is my best guess at the topics that we will cover, along with the associated reading assignments.

| Date        | Topic                                      | Reading               |
|-------------|--|-----------------------|
| 18 January  | Introduction, Probability                  | Chapter 1             |
| 23 January  | Probability                                | Chapter 2             |
| 25 January  | Probability                                | Chapter 2             |
| 30 January  | Exploratory data analysis, Organizing data | 3.1–3.2               |
| 1 February  | Exploratory data analysis, Organizing data | 3.3–3.4, except 3.3.6 |
| 6 February  | Exploratory data analysis, Organizing data | 3.3–3.4, except 3.3.6 |
| 8 February  | Correlation                                | 3.5–3.6               |
| 13 February | Discrete distributions                     | 4.1–4.3               |
| 15 February | <b>No Class</b>                            |                       |
| 20 February | Discrete distributions                     | 4.1–4.3               |
| 22 February | Continuous distributions                   | 4.4–4.5               |
| 27 February | Continuous distributions                   | 4.4–4.5               |
| 1 March     | Sampling distributions, Testing            | 5.1                   |

|             |  |                |
|-------------|--|----------------|
| 6 March     | Parametric tests   | 5.2            |
| 8 March     | <b>Mid-term Exam</b>                                     |                |
| 13–15 March | <b>Spring Break–No Class</b>                             |                |
| 20 March    | Mid-term review  |                |
| 22 March    | Parametric tests   | 5.2            |
| 27 March    | Nonparametric tests                                      | 5.3            |
| 29 March    | Nonparametric tests                                      | 5.3            |
| 3 April     | Field significance, False discovery rate                 | 5.4            |
| 5 April     | Least squares regression                                 | 7.1–7.2        |
| 10 April    | Least squares regression                                 | 7.4            |
| 12 April    | Classical statistical forecasting, MOS, Perfect prog     | 7.3.2, 7.5     |
| 17 April    | Ensemble forecasting                                     | 7.6-7.7        |
| 19 April    | Ensemble forecasting, Subjective probability forecasting | 7.8            |
| 24 April    | Forecast verification (nonprobabilistic)                 | 8.1–8.3        |
| 26 April    | <b>Undergraduate Research Symposium–No Class</b>         |                |
| 1 May       | Forecast verification (probabilistic)                    | 8.4–8.5        |
| 5 May       | <b>Final Exam</b>  | 3:00–5:30 p.m. |

## EVALUATION

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There will be homework assignments, one mid-term 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% |
| Mid-term Exam        | 25% |
| Final Exam           | 25% |

I reserve the option to curve the final grades upward at my discretion. In fact, it's highly likely that I will do so. 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.

## 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.
- I am participating in field studies associated with the VORTEX-Southeast research project this semester and may need to cancel class on short notice. I will communicate with you via email regarding cancellations. I will try to stay on schedule, but it is possible that we may fall behind. If so, I may reschedule classes for a Friday or other mutually-agreeable time. I respectfully request your flexibility with scheduling.