ATM 407 – Weather Analysis (4 credit hours)
Fall 2019

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OFFICE HOURS:	by appointment – most easily before/after class

*"In general, **analysis** is defined as the procedure by which we break down an intellectual whole into parts or components. **Synthesis** is defined as the opposite procedure: to combine separate elements or components in order to form a coherent whole." (Wikipedia)*

This class has elements of both.

Bulletin Course Description (http://bulletin.miami.edu/courses-az/atm/):
"Three-dimensional analysis of synoptic-scale weather systems; application of the fundamental laws of atmospheric dynamics to observed weather patterns; practical questions of worldwide data production, exchange and display."

Prerequisite: Thermodynamics (ATM/MSC 305), Dynamics (ATM 405)

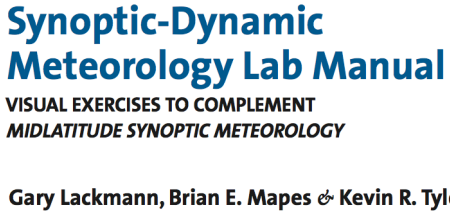
Learning objectives:

The student will understand visually and viscerally the components of synoptic-scale weather and the nature of the forecast challenge, mainly through hands-on lab exercises with data, supplemented with online training modules and printed materials / on-paper exercises as needed. A project – utilizing lab lessons on a case of your own choosing, and finding your own voice about it – will be the final test of your ability to meaningfully and confidently analyze weather.

Textbooks: Purchase is optional, but this is a good and affordable book.

Midlatitude Synoptic Meteorology: Dynamics, Analysis and Forecasting (Lackmann 2011), AMS/ Chicago press. Student price is $75, one copy is on reserve at Richter.

Lab manual for the above (Lackmann, Mapes, Tyle 2017): **LMT**. I have copies for loan ***http://press.uchicago.edu/ucp/books/book/distributed/S/bo14592895.html***.



Course Websites:

UM Blackboard, and

http://GitHub.com/ATMOcanes/ATM407

Lab assignments and background material (lecture notes, etc.) will be posted week by week (sometimes class by class). Students should upload their labs to github as Jupyter notebooks (easily viewed there), or other documents, using cameras as needed for on-paper exercises.

Grading:

20% Attendance and participation are essential to class camaraderie and keeping on track. Absences should be arranged explicitly please.

40% Lab assignments include some on-paper exercises, but mostly computer exercises. Installing software on personal computers is encouraged, so extra lab hours are not needed.

20% Exam There will be one exam at the end of the first module, covering the academic basics (learning outcomes) that the first module of the course is trying to teach you. We will practice and revisit this exam a few times through the module, so that at official exam time you can just come in and express your knowledge in a closed-book, timed manner.

20% Projects at the end of semester. We will meet individually to arrange:

- Contribute weather analyses to Wikipedia
    - Analyze a historical synoptic weather event using the concepts and visualizations from labs (captured as Favorite Displays in your IDV) and original sources (books, newspapers, old charts, etc.)
- Complete some COMET/MetEd modules, sharing a few key points & surprises
- Perform some advanced python analyses of data from the labs or from your case
- Produce high-quality YouTube screencasts of lab software instructions/examples

Honor code: Students may help each other, but the work you turn in should be your own.

COURSE TOPICS

There will be 3 main modules.

Module 1: Basics of weather analysis, gathering up key points of dynamics (405, 406) →407. Lab exercises from LMT are organized into its chapters, as shown at right -->

Module 2: The forecast challenge: models, data assimilation, ensembles and uncertainty, fundamental predictability limits due to subtle interactions. Work will include COMET modules as well as lab exercises.

Module 3: Find your meteorologist voice! Projects.