Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**ATM 651: Introduction to Atmospheric Dynamics, Fall 2024, Brian Mapes**

Intake questionnaire to help us all know each other, & help me tailor the class…

***Not a test***, just to help me see where to focus. Please be verbose & as honest as willing!

Getting to know you a bit:

“Hometown”, college, prior town... helps me use geography to prop up my memory, thank you

How did you get interested in atmospheric science? Sky events, or the idea of a sphere-planet?

What program are you in? PhD advisor & topic? MPS & track?

Might you please list other classes and their times & days, for devising meetups & makeups?

Might you send [mapes@miami.edu](mailto:mapes@miami.edu) some summer break (or other) photos or slides involving the atmosphere or clouds, and be willing to share thoughts or questions it raises in your mind if I gather these and show them Wednesday? Beauty or science, either way.

How do you learn best? Visual, written oral, a mix?

How do you accumulate material? How do you take notes (paper? tablet? typing/computer)?

How do you prefer to get on-paper type math/physics assignments? Electronic, printed?

Any study habits/advice that may interest me & maybe others? Mind maps, note app/services?

How’s your computer skill? Windows, Mac? Cloud backup? Any experience in open source scientific software worlds (Github, Python, R, …)? Or commercial (Matlab, IDL, …)?

About the material:

Please use these summary symbols, and then share a few words, especially questions if you have them & can articulate that! *This will help me teach less badly!*

✅= I had a course & did well, ~ = took it/seen it but it didn’t stick,  = unfamiliar

Algebra, trig (sine and cosine), calculus (derivatives & integrals, exp & log). Complex exp()

*Derivative:* What property of a curve f(x) or a surface Z(x,y) does a *derivative* measure?

Advanced: If we have temperature in space & time as T(x,y,z,t), what are vs. ?

*Second derivative:* What property of a curve f(x) or a surface Z(x,y) does it measure?

*Ordinary differential equation* (ODE): What f(t) satisfies df/dt = 3f?

*Vectors in spaace!* (functions of multiple dimensions like space-time; partial derivatives).

A group of pigs in space

Description automatically generated’ A graph of arrows pointing upwards

Description automatically generated with medium confidence

*Scalar & vector fields in physics, with units: Fluid dynamics or electricity/magnetism?*

*Partial differential equation* (PDE): heard of diffusion? advection? *Div, grad, curl?*

*Statistics:* What is a PDF, what is the mean, what is standard deviation? Got questions or curiosities in this realm?

*Chaos and complexity:* Fundamental limits to predictability, heard/learnt about it?

*Earth’s atmosphere What textbooks have you seen or used? Wallace and Hobbs?*

*Atmosphere generalities.* Just for instance: what is the troposphere, about how tall is it?

Can you articulate any questions or curiosities, hopes for this course to clarify/teach?

*Atmosphere Thermodynamics*. For instance: how is humidity measured? What is lapse rate? Got any specific questions I could make sure to touch in on?

*Synoptics:* What is a trough, and where are the clouds and rain typically in relation to it?

*Storms:* Why do cloudy updrafts rise? How long does rain take to form in a cloud & why?

Some vocabulary we will cover: how much is familiar? (we will cover it again anyway…)

✅ = you understand the word (so jot something! Association, factoid, whatever…)

~ = you have seen the word but have questions/confusions (then please Ask!)

* = unfamiliar term, what associations or misconceptions should we clarify?

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| --- | --- | --- | --- |
| Gradient | Divergence | Streamline | Trajectory |
| Laplacian | Conservation law | Pressure | Acceleration |
| Frequency (of wave) | Period (of wave) | Wavelength | Amplitude |
| Flux | Force | Momentum | Vorticity |
| Kinetic energy | Potential energy | Entropy | Enthalpy |
| Hydrostatic balance | Geostrophic balance | Thermal Wind | Parcel |
| Timescale | Synoptic | Mesoscale | Anomaly |

*Any other words or ideas you have heard about & have curiosities or questions about?*

*Have you ever read a research article, or written one? Online, printouts? If so, how do you assimilate such material into your growing worldview? Take notes (store/access them how?) Margin notes on printouts? Do you keep a notes/blog digital archive?*

*Computers again*: What coding language(s) are you best at? Where do you type? (command line, Jupyter notebook/lab, a GUI Development Environment, an application like Matlab or IDL, other?) Got a GitHub account? What is your interest level in computing-based homeworks or projects?

Have you been using the new AI tools? For what, which one(s)? (language, image)? What do you think they are especially good or bad for, looking ahead 5-10 years (grad/career time frame)? )

*Project ideas*: Class will culminate in projects, which may be individual or team. Any ideas at the outset about something you’d like to learn or master and share with the class? Readings, calculations, small research efforts? *Find your curiosity, and try to keep it in sight*, it is the most reliable resource for pulling you through the work (so much better than push-type motivations!)

Anything else?

Introduce yourself more, share career goals or hopes, or worries or fears (I won’t embarrass you in public if sensitive). Got big big curiosities, or questions about fluids, or about the atmosphere, its dynamics on various timescales, grad school, or …? Anything to help the class get to know each other please ☺, and for me to better imagine how to help YOU advance your learning goals, in our 40 (!) class hours together.