

ATM 317: Dynamic Meteorology II

Spring 2019

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Office Hours: Tuesday and Thursday, 10:30 – 11:30 am
Or by appointment

Teaching Assistant: Daniel Reese
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Or by appointment

Location: BB 217	Course Number: 1135
Time: Monday, Wednesday & Friday 10:25-11:20 am	Credits: 3
	Prerequisite: ATM 316

Web: <http://www.atmos.albany.edu/facstaff/andrea/courses/atm317.html>
The course page will be updated with suggested readings, copies of homework assignments, and in-class handouts. Please bookmark this page for the semester.

Accessibility:

If you have a documented disability and may require some accommodation or modification in procedures, class activity, instruction, etc., please see me early in the semester. If you need forms or information, please visit the Disability Resource Center;
<http://www.albany.edu/disability/index.shtml>

Academic Integrity:

It is every student's responsibility to become familiar with the standards of academic integrity at the University. Claims of ignorance, of unintentional error, or of academic or personal pressures are not sufficient reasons for violations of academic integrity. Please see the current Undergraduate Bulletin or University Libraries for more information on academic integrity.
http://www.albany.edu/undergraduate_bulletin/regulations.html

Please turn off your cell phone before you get to class. All electronic devices, including cell phones, must be put away before class begins and in no way will they be tolerated during exams. You will be asked to leave the classroom for distracting use of electronic devices.

Course Description:

An application of the governing equations to describe and understand synoptic to planetary scale phenomena, including vertical motion, jet streaks, and the frontal cyclone; introduction to the concepts of vorticity and potential vorticity.

Course Topics (Tentative):

1. Review (Kinematic properties of flows, balanced flows)
 2. Thermal Wind
 3. Circulation
 4. Vorticity
 5. Potential vorticity
 6. Vorticity equation
 7. Structure of extratropical circulations
 8. Quasi-geostrophic approximations and the ageostrophic wind
 9. Quasi-geostrophic omega equation
 10. Ageostrophic circulations
 11. The \mathbf{Q} -vector *
 12. Quasi-geostrophic height tendency*
- * Topics introduced if time allows

Texts:

Mid-latitude Atmospheric Dynamics by J. E. Martin (Required)

An Introduction to Dynamic Meteorology by J. R. Holton (Recommended)

Grading: A-E

Homework (5-6): 35%

In class assignments and presentations: 10%

Quizzes (2): 20%

Midterm (*Wed, 22 March 2018*): 15%

Final (*Fri, 11 May 2018 at 3:30 pm*): 20%

I know you have a life outside of class, therefore I give everyone one free late day to be used on one assignment. *Once you have used your late day, a late assignment will incur a 10% deduction per day. If solutions have been discussed in class, you can no longer turn in your late assignment and you will receive a zero on that assignment.*

I will come to class prepared to lecture but I encourage you to start a conversation and ask questions in class if you do not understand something. If you have a question, chances are someone else has the same question, go ahead and speak up. The classroom should be an open and inviting environment so that everyone feels free to participate and discuss the material. Everyone in the classroom is responsible for creating this type of environment; I ask you to leave your distractions at the door and participate as a community of learners.

Tentative Schedule

ATM 317: Spring 2019

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	M	W	F		M	W	F		
January	21	23	25	March	18	20	22		
	<i>No Class</i>	First Day of Class Review	Review & Kinematic flows	<i>Spring Break</i>					
	28	30	1		25	27	29		
	Review & Kinematic flow	Review & Eq. of Motion	Force Balances		Sutcliffe Development Theorem	Applying Sutcliffe Dev. Theorem	Revisit QG assumptions		
February	4	6	8	April	1	3	5		
	Thickens and Thermal Wind	Interpreting Thermal Wind	What is Circulation?		<i>QG omega equations</i>	Trenberth form of Omega eq	The QG Assumptions		
	11	13	15		8	10	12		
	Kelvin's Circulation Theorem	Bjerknes Circulation Theorem	Quiz 1		Deformation terms	Geostrophic Paradox	Geostrophic Adjustment		
	18	20	22		15	17	19		
	Circulation vs vorticity	Vorticity in Natural Coords	Vorticity Equation		Quiz 2	Vector form of forcing	Natural Coordinate form of Q		
	25	27	1		22	24	26		
	The Vorticity eq terms	Potential Vorticity	PV Conservation Using PV		<i>Holiday</i>	Q vector form QG Omega Eq	Applications of the Q-vector		
March	4	6	8	May	29	1	3		
	Hydrodynamic Instability	Eddy Kinetic Energy	Diagnosing Vertical Motion		Q-vector and Cyclogenesis	Q-vector and Frontogenesis	Bring it all together		
	11	13	15		6	8	10		
	Sutcliff Form	Midterm	Sutcliffe & Omega		Last week exercise	Last week exercise			
						Wednesday, May 15			
						Final Exam 3:30 – 5:30 pm			