



North Carolina Agricultural and Technical State University
College of Science & Technology
Applied Science & Technology PhD Program

Dynamic Meteorology
Course Syllabus

Course Information

Course Number/Section: AST 851
Term: Fall 2019
Semester Credit Hours: 3
Times and Days: TR 2:00-3:15
Class Location: Gibbs 302

Instructor Contact Information

Instructor Dr. Yuh-Lang Lin
Office Location 302H Gibbs Hall
Office Phone 336-285-2127
Email Address ylin@ncat.edu
Teaching Assistant Shak Karim (shajedul.87@gmail.com)

Student Hours: 11-12 MWF or by appointment

Note: Students are responsible for reading, understanding, and following their syllabi.

Course Pre-requisites: Solid calculus, PDE and General Physics

Course Description

This course presents the application of classical and physical hydrodynamics to the large-scale atmospheric motion. Topics covered include scale analysis of dynamic equations, elementary applications of the basic equations, circulation and vorticity

Required Textbooks and Materials

Required Text and Manual

“An Introduction to Dynamic Meteorology” by J. R. Holton and G. J. Hakim, 5th Ed., Elsevier Academic Press, 2013

Useful Reading/reference (not required)

“Mesoscale Dynamics” by Yuh-Lang Lin, Cambridge Univ Press, 2007

Assignments & Academic Calendar (Subjected to change)

Presentation Schedule

Date	Pres. #	Presentation Title	Remarks
8/22	1	Introduction, Real Forces, Apparent Forces	Sec. 1.1-1.2
8/27	2	Coordinate Systems, Vertical Coordinates	Sec. 1.3-1.4
8/29	3	Derivation of Equation of Motion	Sec. 2.1 -2.3
9/3	4	Scale Analysis	Sec. 2.4
9/5	5	Continuity Equation and Approximations	Sec. 2.5
9/10	6	The Thermodynamic Energy Equation	Sec. 2.6
9/12	7	Thermodynamics of the Atmosphere Boussinesq Approximation	Sec. 2.7-2.8
9/17	8	Basic Concepts: Static Instability, Conditional Instability, Potential Instability	Sec. 2.9
9/19	9	Basic Eq. in Isobaric Coordinates	Sec. 3.1

9/24	10	Balanced Flow	Sec. 3.2
9/26	11	Trajectories, Streamlines and Streamfunction	Sec. 3.3
10/1	12	Thermal Wind	Sec. 3.4
10/3	13	Diagnostic of Vertical Motion	Sec. 3.5
10/8	14	Surface Pressure Tendency	Sec. 3.6
10/10		Midterm	
10/14-15		Fall Break	
10/17	15	Circulation Theorems	Sec. 4.1
10/22	16	Vorticity, Vorticity Equation	Sec. 4.2-4.3
10/24	17	Potential Vorticity	Sec. 4.4
10/29	18	Introduction to General Circulation	Ch.10
10/31	19	Quasi-Geostrophic Approximation	Sec. 6.1
11/5	20	Quasi-Geostrophic Vorticity Equation	Sec. 6.2
11/7	21	Quasi-Geostrophic Prediction	Sec. 6.3
11/12	22	Diagnostic of Vertical Motion	Sec. 6.4
11/14	23	Diagnostic of Vertical Motion	Sec. 6.4
11/19	24	Idealized Model of a Baroclinic Disturbance	Sec. 6.5
11/21	25	Introduction to Wave Dynamics	Ch.5
11/26	26	Introduction to PBL	Ch.8
11/27-29		Thanksgiving Holiday (W-F)	
12/3	27	Introduction to Mesoscale Circulations	Ch.9
12/5	28	Reading Day	
12/9-13		Final Exam	

Grading Scale (subjected to change)

94% and above	A	76% - 74%	C
93% - 90%	A-	73% - 70%	C-
89% - 87%	B+	69% - 67%	D+
86% - 84%	B	66% - 64%	D
83% - 80%	B-	63% - 60%	D-
79% - 77%	C+	60% - 00%	F

Grading Allocation

Course grades are based on a weighted grading scale of 100%. The breakdown for the course is as follows:

(1) Homework	20%
(2) Midterm	35%
(3) Final	45%

Course Policies

Make-up exams

No make-up mid exams are allowed. With excused absences, the homework and final exam with appropriate weights will be used to evaluate the overall grade.

Extra Credit

No Extra Credit

Late Work

Penalty will be applied to late submission of homework unless permitted before hand by the instructor.

Special Assignments

Not applicable

ACADEMIC DISHONESTY POLICY

Academic honesty is absolutely essential. Cheating, plagiarism, or other academic misconduct will not be tolerated. If you are caught cheating, you will not pass this course and will be subject to any and all penalties specified in the student honor code. If a student is found cheating, she or he will receive an “F” for that assignment. If a student is found cheating a second time, she or he will receive an “F” for the course. See the Undergraduate Bulletin for the university Academic Dishonesty Policy.

COURSE MATERIALS

Blackboard: Students are required to be familiar with the use of Blackboard. Information, assignments, tests, and quizzes will be given on Blackboard; therefore, students must be able to navigate the site successfully to do well in the course. If you are having problems with Blackboard, it is the student’s responsibility to make the professor aware of your problems and to aggressively seek solutions. Go to http://www.ncat.edu/~bbsupprt/Tips/Online_Learning_Student_FAQs.pdf for frequently asked Blackboard questions and contact info for a Blackboard consultant. If you use IE 8.0 while taking online assessments, note the actions that you should take are described at http://www.ncat.edu/~bbsupprt/Tips/IE8_Compatibility_View.pdf

EMAIL POLICY

Official correspondence from faculty, instructors, and graduate assistants will use the NCAT email address. Students are responsible for the information received and are required to monitor their email accounts on a regular basis. In accordance with the Aggie Pride Code, students should consistently communicate and behave in a manner that displays integrity, honesty, and sound character when using email to communicate with faculty, instructors, or graduate teaching assistants. Please make sure you consult the course outline / syllabus, other handouts, and the course website BEFORE submitting inquiries by email.

Special Assignments

No special assignments are anticipated.

Technical Support

If you experience any problems with your A&T account you may call Aggie Tech Support (formerly Help Desk) at 336.334.7195.

Field Trip Policies / Off-Campus Instruction and Course Activities

No field trips are anticipated for this semester. There is no travel and/or risk-related activity associated with this course.

Off-campus, out-of-state, and foreign instruction and activities are subject to state law and University policies and procedures regarding travel and risk-related activities. Information regarding these rules and regulations may be found at the website address: Student Travel Procedures and Student Travel Activity Waiver- <http://www.ncat.edu/student-affairs/student-services/isso/student-information/travel.html>.

Additional information is available from the office of Student Affairs, please check the website at <http://www.ncat.edu/student-affairs>.

Student Affairs website <http://www.ncat.edu/~staffair/>;

Student Handbook: <http://www.ncat.edu/~deanofst/Handbook.htm>;

Student Travel Procedures and Student Travel Activity Waiver
<http://businessfinance.ncat.edu/policies%20and%20procedures%20index.htm>

Additional information is available from the office of Student Affairs, please check the website at <http://www.ncat.edu/~staffair/>.

Below is a description of any travel and/or risk-related activity associated with this course.

Other Policies (e.g., copyright guidelines, confidentiality, etc.)

Student Handbook: <http://www.ncat.edu/~deanofst/Handbook.htm>

Family Educational Rights and Privacy Act

http://www.ncat.edu/~registra/ferpa_info/index.htm

Student Conduct & Discipline

North Carolina A&T State University has rules and regulations that govern student conduct and discipline meant to ensure the orderly and efficient conduct of the educational enterprise. It is the responsibility of each student to be knowledgeable about these rules and regulations. Please consult the undergraduate

http://www.ncat.edu/~acdaffrs/Bulletin_2008-2010/2008-2010_Undergraduate_Bulletin.pdf

and graduate bulletins: 2008-2010 Graduate Catalog.doc

<http://www.ncat.edu/~gradsch/cstudents.html> and student handbook

<http://www.ncat.edu/~deanofst/Handbook.htm> for detailed information about specific policies such as academic dishonesty, cell phones, change of grade, disability services, disruptive behavior, general class attendance, grade appeal, incomplete grades, make up work, student grievance procedures, withdrawal, etc.

These descriptions and timelines are subject to change at the discretion of the Professor.

01.27.09 – Submitted to Faculty Senate by LEW