NORTH CAROLINA AGRICULTURAL AND TECHNICAL STATE UNIVERSITY

COURSE SYLLABUS

College Name: CoST

Department Name: Applied Science & Technology (AST) Ph.D. Program

Course Name: Dynamic Meteorology

COURSE INFORMATION

- Course Number/Section: AST 851
- Term: Fall 2023
- Semester Credit Hours: 3
- Times and Days: 0930-1045
- Class Location: Gibbs 302

INSTRUCTOR CONTACT INFORMATION

☐ Instructor: Dr. Yuh-Lang Lin
☐ Office Location: Gibbs 302H
☐ Office Phone: 336-285-2127 (O)
☐ Email Address: ylin@ncat.edu
☐ Teaching Assistant: Jackson Wiles <jtwiles@aggies.ncat.edu>

STUDENT HOURS

WF 1200-1330 [For longer discussions, make an appointment via email for online meeting.]
Monday ☐ Tuesday ☐ Wednesday ☒ Thursday ☐ Friday ☒

COURSE PREREQUISITES

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.

STUDENT LEARNING OBJECTIVES/OUTCOMES (SLO)

Objective: Use analytical thinking skills to evaluate information critically

Outcome: Students will demonstrate the ability to answer conceptual questions on examination questions.

Objective: Effectively relate basic ideas and concepts to more sophisticated atmospheric systems.

Outcome: Students will demonstrate the ability to employ critical thinking in answering short questions as well as solving problems on examinations.

Objective: Use a wide range of disparate information and knowledge to draw references and summarize various concepts, theories, and observational evidence in the literature.

Outcome: Student will demonstrate the ability to absorb various concepts, theories and observations in assigned references and summarize and present them to the class.

REQUIRED TEXTBOOKS AND MATERIALS

REQUIRED TEXTS:

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

REQUIRED MATERIALS:

NA

SUGGESTED COURSE MATERIALS

SUGGESTED READINGS/TEXTS:

"Mesoscale Dynamics" by Yuh-Lang Lin, Cambridge University Press, 2007

SUGGESTED MATERIALS:

NA

GRADING POLICY

ASSIGNMENTS AND GRADING POLICY

94% -100%	A		76% - 74%	C
93% - 90%	A-		73% - 70%	C-
89% - 87%	B+		69% - 67%	D+
86% - 84%	B		66% - 60%	D
83% - 80%	B-		59% - 0%	F
79% - 77%	C+			

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

The Blackboard and MesoLab website are the primary online instructional and course communications platform. Students can access the course syllabus, assignments, grades, and learner support resources. Students are encouraged to protect their login credentials, complete a Blackboard orientation and log in daily to course.

MAKE-UP EXAMS

NA

EXTRA CREDIT

NA

LATE WORK

Penalty may be applied

SPECIAL ASSIGNMENTS

NA

Students are expected to attend class and participate on a regular basis in order to successfully achieve course learning outcomes and meet federal financial aid requirements (34 CFR 668.22). Class attendance in online courses is defined as active participation in academically-related course activities. Active participation may consist of course interactions with the content, classmates, and/or the instructor. Examples of academically-related course activities include, but are not limited to:

- Completing and submitting assignments, quizzes, exams, and other activities within Blackboard or through Blackboard (3rd-party products).
- Participating in course-related synchronous online chats, discussions, or meeting platforms such as Blackboard Collaborate in which participation is tracked.

CLASSROOM CITIZENSHIP

Courtesy, civility and respect must be the hallmark of your interactions.

COMPLIANCE WITH THE AMERICANS WITH DISABILITIES ACT

North Carolina A&T State University is committed to following the requirements of the Americans with Disabilities Act Amendments Act (ADAAA) and Section 504 of the Rehabilitation Act. If you need an academic accommodation based on the impact of a disability, you must initiate the request with the Office of Accessibility Resources (OARS) and provide documentation in accordance with the Documentation Guidelines at N.C. A&T. Once documentation is received, it

will be reviewed. Once approved, you must attend a comprehensive meeting to receive appropriate and reasonable accommodations. If you are a student registered with OARS, you must complete the Accommodation Request Form to have accommodations sent to faculty.

OARS is located in Murphy Hall, Suite 01. We can be reached at 336-334-7765, or by email at accessibilityresources@ncat.edu. Additional information and forms can be found on the web at https://www.ncat.edu/provost/academic-affairs/accessibility-resources/index.php.

Please note: Accommodations are not retroactive and begin once the Disability Verification Form is provided to faculty.

TITLE IX

North Carolina A&T State University is committed to providing a safe learning environment for all students—free of all forms of discrimination and harassment. Sexual misconduct and relationship violence in any form are inconsistent with the university's mission and core values, violate university policies, and may also violate federal and state law. Faculty members are considered "Responsible Employees" and are required to report incidents of sexual misconduct and relationship violence to the Title IX Coordinator. If you or someone you know has been impacted by sexual harassment, sexual assault, dating or domestic violence, or stalking, please visit the Title IX website to access information about university support and resources. If you would like to speak with someone confidentially, please contact the Counseling Services 336-334-7727 or the Student Health Center 336-334-7880.

TECHNICAL SUPPORT

If you experience any problems with your A&T account, you may call Client Technology Services (formerly Aggie Tech Support and Help Desk) at 336-334-7195, or visit https://hub.ncat.edu/administration/its/dept/ats/index.php.

FIELD TRIP POLICIES / OFF-CAMPUS INSTRUCTION AND COURSE ACTIVITIES

NA

STUDENT HANDBOOK

https://www.ncat.edu/campus-life/student-affairs/departments/dean-of-students/studenthandbook.php

STUDENT TRAVEL PROCEDURES AND STUDENT TRAVEL ACTIVITY WAIVER

https://hub.ncat.edu/administration/student-affairs/staff-resources/studen_activity_travel_waiver.pdf

OTHER POLICIES *(e.g., Copyright Guidelines, Confidentiality, etc.)*

STUDENT HANDBOOK

https://www.ncat.edu/campus-life/student-affairs/departments/dean-of-students/studenthandbook.php

Graduate Catalog

SEXUAL MISCONDUCT POLICY

https://www.ncat.edu/legal/title-ix/sexual-harassment-and-misconduct-policies/index.php

FAMILY EDUCATIONAL RIGHTS AND PRIVACY ACT (FERPA)

https://www.ncat.edu/registrar/ferpa.php

STUDENT COMPLAINT PROCEDURES

https://www.ncat.edu/current-students/student-complaint-form.php

STUDENT CONDUCT AND 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 following 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.:

- Undergraduate Bulletin https://www.ncat.edu/provost/academic-affairs/bulletins/index.php
- Graduate Catalog https://www.ncat.edu/tgc/graduate-catalog/index.php
- Student Handbook https://www.ncat.edu/campus-life/student-affairs/departments/dean-of-students/studenthandbook.php

ACADEMIC DISHONESTY POLICY

Academic dishonesty includes but is not limited to the following:

1. Cheating or knowingly assisting another student in committing an act of cheating or other academic dishonesty;
2. Plagiarism (unauthorized use of another's words or ideas as one's own), which includes but is not limited to submitting exams, theses, reports, drawings, laboratory notes or other materials as one's own work when such work has been prepared by or copied from another person;
3. Unauthorized possession of exams or reserved library materials; destroying or hiding source, library or laboratory materials or experiments or any other similar actions;
4. Unauthorized changing of grades, or marking on an exam or in an instructor's grade book or such change of any grade record;
5. Aiding or abetting in the infraction of any of the provisions anticipated under the general standards of student conduct;
6. Hacking into a computer and gaining access to a test or answer key prior to the test being given. A&T reserves the right to search the emails and computers of any student suspected of such computer hacking if a police report of the suspected hacking was submitted prior to the search; and
7. Assisting another student in violating any of the above rules.

A student who has committed an act of academic dishonesty has failed to meet a basic requirement of satisfactory academic performance. Thus, academic dishonesty is not only a basis for disciplinary action but may also affect the evaluation of a student's level of performance. Any student who commits an act of academic dishonesty is subject to disciplinary action.

In instances where a student has clearly been identified as having committed an act of academic dishonesty, an instructor may take appropriate disciplinary action, including a loss of credit for an assignment, exam or project; or awarding a grade of "F" for the course, **subject to review and endorsement by the chairperson and dean**.

ASSIGNMENTS AND ACADEMIC CALENDAR

Include topics, reading assignments, due dates, exam dates, withdrawal dates, pre-registration and registration dates, all holidays and convocations.*

DATE	Pres #	SUBJECT	READING IN TEXT, ACTIVITY, HOMEWORK, EXAM	Remarks (F22 actual schedule)
8/24	1	Introduction, Real Forces, Apparent Forces	Sec. 1.1-1.2	Sec. 1.1
8/29	2	Coordinate Systems, Vertical Coordinates	Sec. 1.3-1.4	Sec. 1.2
8/31	3	Derivation of Equation of Motion	Sec. 2.1 -2.3	Sec. 1.3-1.4
9/5	4	Scale Analysis	Sec. 2.4	Sec. 2.1-2.2
9/7	5	Continuity Equation and Approximations	Sec. 2.5	Sec. 2.3
9/12	6	Derivation of Thermodynamic Equation		Sec. 2.4
9/14	7	Thermodynamics of the Atmosphere Boussinesq Approximation	Sec. 2.6 Sec. 2.7-2.8	Sec. 2.4
9/19	8	Basic Concepts: Static Instability, Conditional Instability, Potential Instability	Sec. 2.9	Sec. 2.5 (Derivation of Continuity Eq.)
9/21	9	Basic Eq. in Isobaric Coordinates	Sec. 3.1	Sec. 2.5 (Scale analysis of Conti. Eq.)
9/26	10	Balanced Flow	Sec. 3.2	Sec. 2.5-2.6
9/28	11	Trajectories, Streamlines and Streamfunction	Sec. 3.3	
10/3	12	Thermal Wind	Sec. 3.4	
10/5 (R)		Midterm		
10/9-10		Fall Break (M-T)		
10/12	13	Diagnostic of Vertical Motion	Sec. 3.5	
10/17	14	Surface Pressure Tendency	Sec. 3.6	
10/19	15	Circulation Theorems	Sec. 4.1	
10/24	16	Vorticity, Vorticity Equation	Sec. 4.2-4.3	
10/26	17	Potential Vorticity	Sec. 4.4	
10/31	18	Introduction to General Circulation	Ch.10	
11/2	19	Quasi-Geostrophic Approximation	Sec. 6.1	

11/7	20	Quasi-Geostrophic Vorticity Equation	Sec. 6.2	
11/9	21	Quasi-Geostrophic Prediction	Sec. 6.3	
11/14	22	Diagnostic of Vertical Motion	Sec. 6.4	
11/16	23	Diagnostic of Vertical Motion	Sec. 6.4	
11/21	24	Idealized Model of a Baroclinic Disturbance	Sec. 6.5	
11/22-24		Thanksgiving Holiday		
11/28	25	Introduction to Wave Dynamics	Ch.5	
11/30	26	Introduction to PBL	Ch.8	
12/5	27	Introduction to Mesoscale Circulations	Ch.9	
12/7	28	Reading Day		
12/11-15		Final Exam		

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