



# NORTH CAROLINA AGRICULTURAL AND TECHNICAL STATE UNIVERSITY

## Fall 2022 Course Syllabus

### College of Science & Technology

### Applied Science & Technology Ph.D. Program

*NOTE: Students are responsible for reading, understanding and following the syllabus.*

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#### Graduate Course Information

Course Name: [Mesoscale Convective Systems](#)

Course Number/Section: [AST 885-005](#)

Credit Hours: 3

Days and Times: [1300 – 1530 pm R \(Sec. 1: lectures; Sec. 2: research discussion\)](#)

Class Location: [307A Gibbs Hall](#)

#### Instructor Contact Information

Instructor: [Dr. Yuh-Lang Lin](#)

Office Location: [Gibbs 302H](#)

Email Address: [ylin@ncat.edu](mailto:ylin@ncat.edu)

Office Phone: [336-285-2127](tel:336-285-2127)

#### Communication

*Students will receive an answer to all communications by email within 48 hours excluding holidays. The secondary point of contact will be Dr. Shak Karim. See below for his email address.*

Teaching Associate: [Dr. Shak Md Shajedul Karim <skarim@aggies.ncat.edu>](mailto:skarim@aggies.ncat.edu)

#### Student Hours

[9:30-10:45 WF](#). For a longer discussion, email me at [ylin@ncat.edu](mailto:ylin@ncat.edu) to make an appointment.

Monday  Tuesday  Wednesday  Thursday  Friday

#### Course Prerequisites

[Dynamic Meteorology; Atmospheric Dynamics I & II or equivalent](#)

#### Course Description

In this independent study, the fundamental dynamics associated with extreme weather phenomena will be studied, which include isolated convective storms (single-cell storms and downbursts, multicell storms, supercell storms, and tornadoes), mesoscale convective systems (squall lines and rainbands, mesoscale convective complexes (MCC), tropical cyclones), and orographic precipitation. This course will be composed of a literature review and presentation given by students, lectures given by the instructor, and a research term paper accomplished by students.

#### 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:** Students 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

Any course-level subscriptions and tools linked in Blackboard Learn learning management system (LMS) should be listed here. The Blackboard LMS must have links to their student data privacy statement.

**Required Texts:** Mesoscale Dynamics by Yuh-Lang Lin, Cambridge University Press, 2007

**Required Materials:** N/A

## Suggested Course Materials

**Suggested Readings/Texts:**

- (1) Mesoscale Dynamics (Ch. 1, 2, 7, 8, 9, and 11) by Y.-L. Lin, Cambridge Univ. Press, 2007
- (2) Mountain Meteorology, by C. David Whiteman, Oxford University Press, 2000
- (3) Mountain Weather Distance Learning Course, UCAR, MetEd (online)

**Suggested Materials:** N/A

## Grading Policy

**Course Grade Scale** *[Graduate Level Courses]*

94% and above	A	83% - 80%	B-
93% - 90%	A-	79% - 75%	C+
89% - 87%	B+	74% - 70%	C
86% - 84%	B	69% - 65%	F

## Grading Allocation

Describe how grades are determined in a thorough manner.

- (1) Reading Assignments and Presentations 40%
- (2) Projects 60%

## Course Policies

### Use Of Blackboard as The Learning Management System

MesoLab website and Blackboard are the primary online instructional and course communications platforms. 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 the course.

**Make-Up Exams** NA

**Extra Credit** N/A

**Late Work** [Penalty may be applied.](#)

**Special Assignments** [N/A](#)

## **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](mailto: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](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.**

## Class Schedule [\[Click here for the F22 calendar\]](#)

Presentation Schedule [Chapter numbers are based on Lin 2007]

Date	Pres. #	Presentation Title	Remarks
8/18-8/23	1	Overview	Ch. 1
8/25-8/30	2	Governing equations for mesoscale motions	Ch. 2
9/1-9/6	3	Mesoscale instabilities: Wave energy transfer through instabilities, Integral theorems of stratified flow	Sec. 7.1-7.2
9/8-9/13	4	Static instability, Conditional instability, Potential instability	Sec. 7.3
9/15-9/20	5	Kelvin-Helmholtz (K-H) instability, Inertial instability	Sec. 7.4-7.5
9/22-9/27	6	Symmetric instability, Baroclinic instability	Sec. 7.6-7.7
9/29-10/6	7	Isolated convective storms: single-cell storms and downbursts, multicell storms, effects of shear and buoyancy	Sec. 8.1-8.3
10/10-11		Fall Break (M, T)	
10/13-10/18	8	Supercell storms	Sec. 8.4
10/20-10/25	9	Tornado Dynamics	Sec. 8.5
10/27-11/1	10	MCS: Squall lines and rainbands	Sec. 9.1
11/3-11/8	11	MCS: Mesoscale Convective Complexes	Sec. 9.2
11/10-11/15	12	Tropical cyclones	Sec. 9.3
11/17-11/22	13	Orographic Precipitation: Climatological distribution of precipitation, orographic modification of pre-existing disturbances	Sec. 11.1-11.2
11/23-25		Thanksgiving Holiday	
11/29-12/1	14	Orographic Precipitation: Formation and enhancement mechanisms, Control parameters and moist flow regimes	Sec. 11.3-11.4
12/5-9		Final Exam	

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

Please refer to the Common Policies file for all other University policies.