

College of Natural & Health Sciences
Department of Earth & Atmospheric Sciences**STORM CHASING ON THE GREAT PLAINS**
ESCI 491: GEOSCIENCE FIELD ISSUESSummer 2024 – 3 credits
Travel dates: May 9 – 18, 2024**ESCI 491:** Geoscience Field Issues

- Topic: Storm Chasing in the Great Plains

Instructors: Dr. David Lerach (David.Lerach@unco.edu);
Dr. Wendilyn Flynn (Wendilyn.Flynn@unco.edu)**Prerequisites:** MET 205 or equivalent and instructor consent (i.e., open to anyone who has taken an introductory meteorology lab course; National Weather Service Storm Spotter certification required prior to first day of class – instructor will provide spotter training dates & locations).**Catalog Course Description:** Analysis and investigation of contemporary issues and development of research skills in the fields of earth sciences, atmospheric sciences, environmental sciences, or geosciences. The course may include extensive field work.**Details:** This course provides a hands-on, practical experience of observing the formation, development, and structure of severe weather phenomena over the U.S. Great Plains. Students will gain valuable experience in forecasting the mesoscale conditions that produce such weather, weather data acquisition in the field, and reporting any observed and relevant severe storm information to the National Weather Service and social media in realtime. If an extended period of benign weather conditions develop over the region during the course, then alternate activities in Earth Sciences will be pursued. Examples of alternate activities include: measuring the urban island heat effect in a midwest city, measuring the relationship between temperature, pressure and altitude at Rocky Mountain National Park, or visit a federal meteorological center (e.g. National Center for Atmospheric Research, National Severe Storm Laboratory, Storm Prediction Center, or a National Weather Service Office).**Course Objectives:**

- Learn and practice severe thunderstorm safety
- Forecast the location, type, and likelihood of severe thunderstorms and their hazards
- Develop effective communication skills in disseminating important weather information to mentors, student peers, and National Weather Service Personnel
- Perform *nowcasting* assessments of severe thunderstorm development and evolution using available mesoscale observations, radar, and satellite imagery

- Collect, analyze, and interpret mesoscale data as related to various weather phenomena, including severe thunderstorms
- Observe severe storm phenomena and report hazardous weather and impacts to the proper authorities, particularly to the nearest National Weather Service office
- Compose a weather journal that details the weather forecast, weather observations and other data collected, and main concepts learned from each day of the course
- Visit North American sites of national, cultural, and/or weather-related prominence

Course Materials: NO REQUIRED TEXTBOOK. Any required scientific equipment will be provided to students during the program. Students will only need to bring a journal and other common-sense materials such as paper, pencil, eraser, etc.

Instructor will make use of the following materials:

- XM Satellite Feed of Weather Data through the Mobile ThreatNet Plus Software
- Vehicle GPS & Road Map Software
- Additional portable meteorological instruments contingent on availability and space
- Handouts of tasks to be completed in the field

Theoretical content will be drawn from the following textbooks:

- Mesoscale Meteorology in Midlatitudes by Paul Markowski & Yvette Richardson
- Synoptic-Dynamic Meteorology in Midlatitudes: Volume II: Observations and Theory of Weather Systems, by Howard Bluestein
- Radar for Meteorologists, by Ronald. E. Rinehart

Outline of Course Content:

- Severe Weather Safety
- Severe Weather Climatology in the Central United States
- Operational Tools Used in Severe Weather Forecasting
- Medium Range Forecasting of Severe Weather Potential (Day -3 & Day -2)
- Short Range Synoptic Forecast (Day -1) & Logistics of Final Chase Decision
- Early Bird Forecast & Last-Minute Abort Decision (Day 0)
- Early Warning Visual Signs of Severe Weather or Chase Bust
- Meteorological Data Acquisition in the Field
- *Nowcasting* Using Radar Imagery, Mesoscale Fields & Instability Parameters
- Identification of Severe Weather Structure & Phenomena
- Data analysis, formulation and reporting of results, and compilation of weather journal

Course Requirements: Student punctual attendance and participation is required in daily events. Students may not opt out from daily activities and/or joining the rest of the group in the vehicle. The impromptu nature of decision-making does not guarantee that the vehicle will be able to return at the end of the day to its original departure point each day. Students who refuse to follow the instructor's decisions will have their participation terminated and will be issued a failing grade.

Orientation Meeting: Attendance at the pre-data collection & orientation meeting is mandatory. All students must attend and pass a vehicle loading/unloading test by completing it in less than 30 seconds.

Daily Weather Discussions: Every student will lead at least one morning weather briefing regarding the chase potential for the upcoming day.

Field Work: The quality of each student's attitude and participation in discussions and their work in the field will be assessed, including their punctual attendance to all course



events (late night or early morning meetings, forecast discussions, data collections, field activities, hotel departure meetings, etc.), as well as overall attitude, cooperation and participation in on-the-road discussions, data analysis and mini quiz activities, and weather briefings. This is a hands-on course. Students who take a passive approach and do not clearly demonstrate an active interest or participation in the course will not receive the highest possible grade in this category. Moreover, an uncooperative or negative demeanor that is detrimental to the group and/or the seamless progress of this course will substantially reduce the student's grade. At any time, the instructor can terminate a student's participation in this course if his/her behavior is unacceptable, disruptive, or detrimental to the rest of the group and the continuation of this course. Should this happen, this student will automatically receive a failing grade in the course.

Social Media: Students are encouraged to use their own social media accounts on various platforms throughout the trip. For credit, students will either 1) individually create three brief announcements with photos and scientific content suitable for Instagram and Twitter/X (or similar social platform), or 2) create a blog post for the EAS website, that positively represents current course activities. The posts will be approved by the instructors before being disseminated through the UNC meteorology Twitter/X and Instagram accounts or EAS website.

Weather Journal: The main form of performance assessment will be the evaluation of a journal that each student will be required to keep for the duration of the course. Each daily entry must discuss the following: 1) main concepts learned or knowledge gained that day, 2) any data collected in the field, 3) information from the daily weather discussion, and 4) a description of observed weather. These journals must be turned in on the last day of the course.

Methods of Evaluation:

ESCI 491 Grade Breakdown:

Forecast Discussions	25%
Field Participation	35%
Social Media	5%
Daily Journal	35%

Grades will be normalized to a score from 0 to 100. Students will be assigned grades of A-F, based on the following percentages (with the option of + and – grades by the instructor if desired):

	87-89.9	B+	77-79.9	C+	67-69.9	D+			
92-100	A	82-86.9	B	72-76.9	C	62-66.9	D	< 60	F
90-91.9	A-	80-81.9	B-	70-71.9	C-	60-61.9	D-		

Liability Release & Other Legal Documentation:

The nature of this course and participation therein involves certain risks. Prior to enrollment in this course, every student is required to sign all liability release documents required by the University. Additionally, students will be required to sign a document verifying that they understand all the unique characteristics and policies of this course prior to enrollment.

Health & Physical Fitness Expectations:

For safety reasons, participants of this program must be in good health and physical fitness. Participants are subjected to extensive periods of confinement in a vehicle, with limited access to facilities of any kind, and limited food options. Consequently, all

	participants must first obtain medical clearance from their doctor or UNC Health Services prior to departure. Furthermore, due to the fast-changing nature of severe weather, all participants must be physically able to load and unload the vehicle in an expeditious manner. All students must have passed a vehicle loading/unloading test and completed it in less than 30 seconds.
Students with disabilities:	It is the policy and practice of the University of Northern Colorado to create inclusive learning environments. If there are aspects of the instruction or design of this course that (cont.) present barriers to your inclusion or to an accurate assessment of your achievement (e.g. time-limited exams, inaccessible web content, use of videos without captions), please communicate this with your professor and contact Disability Support Services (DSS) to request accommodations. Office: (970) 351-2289, Michener Library L-80. PLEASE NOTE ALL STUDENTS MUST MEET THE PHYSICAL FITNESS REQUIREMENTS (see <i>Health & Physical Fitness Expectations</i>) FOR THE SAFETY OF THE ENTIRE CLASS.
Student Code of Conduct:	All students are expected to adhere to the University's <i>Student Code of Conduct</i> , designed to promote a safe and respectful learning environment. For more information about your rights and responsibilities as a UNC student see: https://www.unco.edu/dean-of-students/pdf/Student-Code-of-Conduct.pdf
Academic Integrity:	It is expected that members of this class will observe strict policies of academic honesty and will be respectful of each other. Any instances in which cheating, including plagiarism and unauthorized use of copyrighted materials, computer accounts, or someone else's work is determined, will be referred to Student Services and will be investigated to its full extent.
COVID-19 Policy:	UNC will follow applicable legal requirements and federal, state, and county public health recommendations and mandates in all decisions related to university operations. All students and instructors in this course will comply with the most up to date guidance on public health requirements, such as use of masks.

For all UNC policies, visit:

https://www.unco.edu/center-enhancement-teaching-learning/teaching-resources/syllabus_statements.aspx