

THE UNIVERSITY OF NORTH CAROLINA ASHEVILLE
FACULTY SENATE

Senate Document Number SD6024S

Date of Senate Approval 05/02/2024

Statement of Faculty Senate Action:

APC Document 49 (ATMS):

Establish new courses:

ATMS 265, Mountain Meteorology
ATMS 337, Applied Numerical Weather Prediction
ATMS 428, Severe Weather Field Experience

Effective Date: Fall 2024

1. Add: On page 94, new course, **ATMS 265, Mountain Meteorology:**

265 Mountain Meteorology (3)

An examination of the influence of mountain ranges on local and regional weather conditions. Topics include terrain-forced flows, diurnal mountain winds, clouds and precipitation, and mountain climates. Pre- or corequisite: ATMS 203. See department chair.

Impact: *Mountain Meteorology* is an elective course that is a permanent replacement for what has been offered as a special topics course three times since 2014. The addition of ATMS 265 will have no impact on current students, funding, or staffing needs.

The following items address the requirements for new or revised course proposals:

1. This optional elective course does not fulfill any major or other requirements.
2. Information about the course:
 - a. The student learning outcomes include the following:
 - Understand how adjustments to a local weather forecast might need to be made when meso- and synoptic-scale atmospheric disturbances interact with mountains
 - Inspire a curiosity about the natural world that motivates the student to continue their learning about mountain meteorology beyond this course
 - Develop an ability to make a significant contribution to a team-based research effort
 - b. In its last offering as a special topics course in 2021, this class had 7 students.
 - c. The class meets for 2.5 hours per week.
 - d. This is a lecture course.
 - e. There are no specialized space or material needs.
 - f. This course is 3 contact hours and 3 faculty workload hours.
3. Dr. Douglas Miller will teach this course. Other faculty members in the Department of Atmospheric Sciences can teach the class if necessary.
4. The course has historically been offered every three to four years. The department would like to have the option to offer the course as enrollment and faculty resources allow.
5. Since this proposal only assigns a permanent course number to an existing special topics course, the proposed course will have no impact on the ability of the department to deliver the existing curriculum.
6. This is a unique course that is not part of the UNC Common Numbering System (CNS), nor is there a need to add it to the UNC CNS.

Rationale: Mountain meteorology is an important specialty within the atmospheric sciences and one that especially resonates with students given UNC Asheville's location in the mountains. Students in this course learn the basics of how mountains influence local and regional weather conditions and gain an appreciation for how mountain ranges can modulate large-scale weather systems. Students also learn about the challenges of forecasting for locations in the mountains. ATMS 373, *ST: Mountain Meteorology*, has been offered by Dr. Douglas Miller sporadically, but most recently in Spring 2014, 2017, and 2021. Dr. Miller will continue to offer ATMS 265 as a permanent part of the curriculum when the course schedule allows. Other faculty members in the Department of Atmospheric Sciences can teach the course if necessary.

All faculty in the Department of Atmospheric Sciences agree with this proposal.

2. **Add:** On page 95, new course, **ATMS 337, Applied Numerical Weather Prediction:**

337 Applied Numerical Weather Prediction (3)

A basic introduction to principles of numerical weather prediction and the use of computer models in the forecasting process. Topics include primitive equations, boundary conditions, model physics and parameterizations, and data assimilation. Prerequisite: permission of instructor. See department chair.

Impact: *Applied Numerical Weather Prediction* is an elective course that is a permanent replacement for what has been offered as a special topics course three times since 2010. The addition of ATMS 337 will have no impact on current students, funding, or staffing needs. There are no anticipated impacts to university resources.

The following items address the requirements for new or revised course proposals:

1. This optional elective course fulfills the 300–400 level elective requirement for the weather forecasting and climatology concentrations in the atmospheric sciences major.
2. Information about the course:
 - a. The student learning outcomes include the following:
 - Understand how mathematical devices are applied to the governing laws that determine the evolution of atmospheric structures
 - Improve problem-solving skills by applying knowledge to model-based hands-on activities and experience the limitations of numerical methods
 - Develop the ability to make a significant contribution to a team-based research effort
 - b. In its last offering as a special topics course in 2022, this class had 8 students.
 - c. The class meets for 2.5 hours per week.
 - d. This is a lecture course.
 - e. There are no specialized space or material needs.
 - f. This course is 3 contact hours and 3 faculty workload hours.
3. Dr. Douglas Miller will teach this course. Dr. Godfrey has similar expertise and could also teach the course if necessary.
4. The course has historically been offered only sporadically, but the department would eventually like to offer it more regularly (i.e., on a two-year schedule) as enrollment and faculty resources allow. For now, the department would like to have the option to offer the course only when needed or desired.
5. Since this proposal only assigns a permanent course number to an existing special topics course, the proposed course will have no impact on the ability of the department to deliver the existing curriculum.
6. This is a unique course that is not part of the UNC Common Numbering System (CNS), nor is there a need to add it to the UNC CNS.

Rationale: Numerical weather prediction models are a critical component in the forecasting process, but weather forecasters often do not understand how these models actually work. This course provides our students with this important foundation. ATMS 373, *ST: Applied Numerical Weather Prediction* (and variants of that title), has been offered by Dr. Douglas Miller sporadically, but most recently in Spring 2010, 2015, and 2022. Dr. Miller will continue to offer ATMS 337 as a permanent part of the curriculum when the course schedule allows. Requiring instructor permission to enroll in the course will ensure students have the appropriated Excel skills to succeed.

All faculty in the Department of Atmospheric Sciences agree with this proposal.

3. **Add:** On page 96, new course, **ATMS 428, Severe Weather Field Experience:**

428 Severe Weather Field Experience (3)

Participants travel to the Great Plains to forecast and observe severe weather. Operations are based in Norman, Oklahoma in the heart of tornado alley and close to the location of the climatological maximum in tornado frequency during mid-May. Norman is the home of the National Weather Center, which houses numerous NOAA and University of Oklahoma weather and climate programs including the Storm Prediction Center, the National Severe Storms Laboratory, and a National Weather Service forecast office. Participants receive tours of these and many other facilities, including television studios and private companies, and hear prominent speakers discuss important aspects of severe weather forecasting, graduate school applications, and internship opportunities. Prerequisite: ATMS 103 and permission of instructor. See department chair.

Impact: *Severe Weather Field Experience* is an elective course that is a permanent replacement for what has been offered as a special topics course four times since 2008. The addition of ATMS 428 will have no impact on atmospheric sciences major requirements. Traditionally, faculty are employed under a summer school contract and, with the addition of a zero-credit-hour lab section, receive a summer salary commensurate with the workload required by constant and continuous student contact for 12 days. Students pay for course-related travel and materials, so there is no additional burden to university resources.

The following items address the requirements for new or revised course proposals:

1. This optional elective course fulfills the 300–400 level elective requirement for the weather forecasting and climatology concentrations in the atmospheric sciences major.
2. Information about the course:
 - a. The student learning outcomes include the following:
 - Develop an awareness of a variety of career possibilities and professional-development opportunities
 - Complete advanced storm spotter training
 - Participate in map discussions and gain experience forecasting during severe weather events
 - Engage in stages of the scientific method, including hypothesis development, observations and analysis, and formulation of conclusions based on observations
 - Visit facilities and interact with professionals in various sectors of meteorology
 - Understand atmospheric processes and storm structure and behavior through direct observation
 - Write a research paper based on a combination of theoretical knowledge and firsthand experience
 - b. The class can accommodate a maximum of 12 students, with an ideal enrollment of 8–10 students.
 - c. The class meets continuously for 12 days.
 - d. This is an experiential learning field-based course.
 - e. Students pay for course-related travel and materials, so there are no specific space or material needs provided by the university. The department may explore the option to use the university's 15-passenger van, but this is not required.
 - f. As a special topics course, the university has traditionally paid one summer instructor for 4 contact hours and an additional stipend to a second instructor. With detailed planning and 12 days in the field

with constant supervision and student interaction, the contact and faculty workload hours naturally exceed this amount.

3. Drs. Christopher and Elaine Godfrey will teach this course. Dr. Caitlin Crossett has participated in a similar experience and could serve as a co-instructor for the course if necessary.
4. The course will be offered in a summer term, with the class departing shortly after the spring commencement ceremony. The class will likely take place every two to four years.
5. Since this proposal only assigns a permanent course number to an existing special topics course, the proposed course will have no impact on the ability of the department to deliver the existing curriculum.
6. This is definitely a unique course that is not part of the UNC Common Numbering System (CNS), nor is there a need to add it to the UNC CNS.

Rationale: The *Severe Weather Field Experience* is a life-changing field course that includes a 12-day trip to the Southern Great Plains to forecast and observe severe weather. Along the way, the class tours major operational and research facilities, visits private-sector and broadcast meteorology companies, and attends presentations and discussions from nationally recognized atmospheric scientists on topics such as severe weather, career opportunities, graduate school, and undergraduate research. While the allure of chasing tornadoes initially prompts the students to enroll in the course, the focused career-development aspect of the curriculum increases awareness for the varied career options in the atmospheric sciences and helps students discover where their own capabilities and interests might best suit the discipline. The course thus offers students a comprehensive career-development experience woven within a thrilling adventure. Several of our former students have indicated that the course strongly influenced their future career paths. Participants often express a reinvigorated interest in their undergraduate coursework and in the field of meteorology. A peer-reviewed pedagogical approach article outlining the course appears in the *Journal of Geoscience Education*. This course is a major draw for prospective atmospheric sciences majors. ATMS 428 is a permanent replacement for ATMS 373/473, *ST: Severe Weather Field Experience*, which was offered by Dr. Christopher Godfrey and co-instructors in May 2008, 2009, 2013, and 2017. Dr. Christopher Godfrey and a co-instructor will continue to offer ATMS 428 irregularly in the summers as a permanent part of the curriculum.

All faculty in the Department of Atmospheric Sciences agree with this proposal.