Master Course Syllabus

For additional course information, including prerequisites, corequisites, and course fees, please refer to the Catalog: https://catalog.uvu.edu/

Semester: Spring
Year: 2025
Course Prefix: METO
Course and Section #: 1060-X01
Course Title: Fundamentals of Weather Forecasting
Credits: 3

Course Description

This fully online, asynchronous course introduces the fundamental principles of meteorological processes and mid-latitude weather forecasting. We will focus on the analysis of surface and upper-air weather maps, of soundings, of satellite and radar imagery to analyze current meteorological conditions. We will explore the application of techniques to perform forecasts for basic weather variables such as temperature and precipitation.

Course Attributes

This course has the following attributes:
☒ General Education Requirements
☐ Global/Intercultural Graduation Requirements
☐ Writing Enriched Graduation Requirements
☐ Discipline Core Requirements in Program
☒ Elective Core Requirements in Program
☒ Open Elective
Other: *Click here to enter text.*

Instructor Information

Instructor Name: Alessandro Zanazzi

Student Learning Outcomes

At the end of this course, students will be able to:
1) Explain the fundamental scientific principles that govern the behavior of the atmosphere and the forces that drive atmospheric motions in the horizontal and vertical dimensions.
2) Summarize the methods used to take atmospheric observations, both in situ and remotely.
3) Interpret radar and satellite (i.e., visible, infrared, and water vapor) images.
4) Analyze and interpret meteograms and conventional maps of surface and upper-air data.
5) Analyze soundings on a thermodynamic diagram.
6) Describe the processes by which mid-latitude cyclones form, grow, and dissolve.
7) Apply the most important techniques (statistical models and numerical weather prediction) to create single-point forecasts for basic weather variables.
8) Interpret the forecast discussions of the National Weather Service.

Course Materials and Texts

None.

Course Requirements

Course Assignments, Assessments, and Grading Policy

Your final grade will be determined based on these components:

- Interactive Lectures 10%
- Quizzes 10%
- Labs 20%
- Midterm Exams 20%
- Cumulative Final Exam 20%
- Final Project 20%

Course averages are normalized to a 100-point scale. Final grades will be based on the following scale:

- A = 92-100%
- A- = 88-92%
- B+ = 85-88%
- B = 81-85%
- B- = 78-81%
- C+ = 74-78%
- C = 71-74%
- C- = 67-71%
- D+ = 64-67%
- D = 60-64%
- D- = 57-60%
- E< 57%

- Interactive lectures will consist of slides with quizzes and videos. This is the only assignment type that has no deadlines (they are all due at the end of the semester). You must go over them when you start a new module and can review them before an exam.
- Quizzes will consist of multiple-choice questions on the material of each module. Quizzes will be graded directly by CANVAS. Quizzes are **"open book and open notes"**, and you will have unlimited time. You will have **two attempts** and keep the higher of the two scores.
- Labs will consist in the analysis of current weather data. Labs will be graded by me. Labs are also **"open book and open notes"**. You will have unlimited time and **only one attempt**.
- Midterm exams will consist of fifty multiple choice questions on everything covered since the previous exam. Midterm exams will be graded directly by CANVAS. Midterm exams are **"closed book and closed notes"**. You will have **75 minutes** available to complete them and you will have **only one attempt**. Midterm exams will be remotely proctored by Proctorio.
- The cumulative final exam will consist of one hundred multiple choice questions on everything covered during the semester. The final exam will be graded directly by CANVAS. The final exam is **"closed book and closed notes"**. You will have **150 minutes** available to complete it and you will have **only one attempt**. The final exam will be remotely proctored by Proctorio.
- The final project will involve analyzing current weather and creating a weather forecast in groups of three. I will assign the groups and notify the class at least three weeks before the project is due.
- The following grades will be dropped from your final grade:
    - The lowest grade of the quizzes
    - The lowest grade of the labs
    - The lowest grade of the midterm exams

Required or Recommended Reading Assignments

See below.

General Description of the Subject Matter of Each Lecture or Discussion

Date	Day	Module Number	Module Title	Reading	Assignments**
Jan. 10	F		Orientation		Orientation Quiz Orientation Discussion
Jan. 17	F	1	Introduction to Atmospheric Variables	Interactive Lecture 1	Lab 1 Quiz 1
Jan. 24	F	2	Meteorological Data	Interactive Lecture 2	Lab 2 Quiz 2
Jan. 31	F	3	Remote Sensing of the Atmosphere-Part 1	Interactive Lecture 3	Lab 3 Quiz 3
Feb. 7	F	4	Remote Sensing of the Atmosphere-Part 2	Interactive Lecture 4	Lab 4 Quiz 4
Feb. 14	F	5	Controllers of Air Temperature	Interactive Lecture 5	Lab 5 Quiz 5 Practice Exam*** **Exam 1**
Feb. 21	F	6	Controllers of the Wind	Interactive Lecture 6	Lab 6 Quiz 6
Feb. 28	F	7	Vertical Variations in Temperature-Part 1	Interactive Lecture 7	Lab 7 Quiz 7
Mar. 7	F	8	Vertical Variations in Temperature-Part 2	Interactive Lecture 8	Lab 8 Quiz 8
Mar. 14	F		**Spring Break**		
Mar. 21	F	9	Patterns of Pressure and Winds Aloft	Interactive Lecture 9	Lab 9 Quiz 9 **Exam 2**
Mar. 28	F	10	Upper Level Winds	Interactive Lecture 10	Lab 10 Quiz 10
Apr. 4	F	11	The Cyclone Model	Interactive Lecture 11	Lab 11 Quiz 11
Apr. 11	F	12	Numerical Weather Prediction	Interactive Lecture 12	Lab 12 Quiz 12 **Exam 3**
Apr. 18	F	13	Forecasting Temperatures and Precipitation	Interactive Lecture 13	Lab 13 Quiz 13
Apr. 25	F				**Final Project** **Cumulative Final Exam**

Required Course Syllabus Statements

Generative AI

You may use AI programs (e.g. ChatGPT) to help generate ideas and brainstorm. However, you should note that the material generated by these programs may be inaccurate, incomplete, or otherwise problematic (especially when analyzing weather data). For example, AI-generated language programs are known to "hallucinate", i.e. create references to non-existent resources. Beware that use of AI may also stifle your own independent thinking and creativity.

You may not submit any work generated by an AI program as your own. If you include material generated by an AI program, it should be cited like any other reference material (with due consideration for the quality of the reference, which may be poor).

Using Remote Testing Software

☐ This course does not use remote testing software.

☒ This course uses remote testing software. Remote test-takers may choose their remote testing locations. Please note, however, that the testing software used for this may conduct a brief scan of remote test-takers' immediate surroundings, may require use of a webcam while taking an exam, may require the microphone be on while taking an exam, or may require other practices to confirm academic

honesty. Test-takers therefore shall have no expectation of privacy in their test-taking location during, or immediately preceding, remote testing. If a student strongly objects to using test-taking software, the student should contact the instructor at the beginning of the semester to determine whether alternative testing arrangements are feasible. Alternatives are not guaranteed.

Required University Syllabus Statements

Accommodations/Students with Disabilities
Students needing accommodations due to a permanent or temporary disability, pregnancy or pregnancy-related conditions may contact UVU Accessibility Services at accessibilityservices@uvu.edu or 801-863-8747.

Accessibility Services is located on the Orem Campus in BA 110.

Deaf/Hard of Hearing students requesting ASL interpreters or transcribers can contact Accessibility Services to set up accommodations. Deaf/Hard of Hearing services can be contacted at DHHservices@uvu.edu

DHH is located on the Orem Campus in BA 112.

Academic Integrity
At Utah Valley University, faculty and students operate in an atmosphere of mutual trust. Maintaining an atmosphere of academic integrity allows for free exchange of ideas and enables all members of the community to achieve their highest potential. Our goal is to foster an intellectual atmosphere that produces scholars of integrity and imaginative thought. In all academic work, the ideas and contributions of others must be appropriately acknowledged and UVU students are expected to produce their own original academic work.

Faculty and students share the responsibility of ensuring the honesty and fairness of the intellectual environment at UVU. Students have a responsibility to promote academic integrity at the university by not participating in or facilitating others' participation in any act of academic dishonesty. As members of the academic community, students must become familiar with their rights and responsibilities. In each course, they are responsible for knowing the requirements and restrictions regarding research and writing, assessments, collaborative work, the use of study aids, the appropriateness of assistance, and other issues. Likewise, instructors are responsible to clearly state expectations and model best practices.

Further information on what constitutes academic dishonesty is detailed in UVU Policy 541: *Student Code of Conduct*.

Equity and Title IX
Utah Valley University does not discriminate on the basis of race, color, religion, national origin, sex, sexual orientation, gender identity, gender expression, age (40 and over), disability, veteran status, pregnancy, childbirth, or pregnancy-related conditions, citizenship, genetic information, or other basis protected by applicable law, including Title IX and 34 C.F.R. Part 106, in employment, treatment, admission, access to educational programs and activities, or other University benefits or services. Inquiries about nondiscrimination at UVU may be directed to the U.S. Department of Education's Office for Civil Rights or UVU's Title IX Coordinator at 801-863-7999 – TitleIX@uvu.edu – 800 W University Pkwy, Orem, 84058, Suite BA 203.

Religious Accommodation
UVU values and acknowledges the array of worldviews, faiths, and religions represented in our student body, and as such provides supportive accommodations for students. Religious belief or conscience broadly includes religious, non-religious, theistic, or non-theistic moral or ethical beliefs as well as participation in religious holidays, observances, or activities. Accommodations may include scheduling or due-date modifications or make-up assignments for missed class work.
To seek a religious accommodation, a student must provide written notice to the instructor and the Director of Accessibility Services at accessibilityservices@uvu.edu. If the accommodation relates to a scheduling conflict, the notice should include the date, time, and brief description of the difficulty posed by the conflict. Such requests should be made as soon as the student is aware of the prospective scheduling conflict.

While religious expression is welcome throughout campus, UVU also has a specially dedicated space for meditation, prayer, reflection, or other forms of religious expression.