

SP21 - GEOL 130: Climate and Weather (20794)

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Hello Geology 130 (Weather and Climate Studies) Students

Basic Course Information

Semester	Spring 2021	Instructor Name	Kevin Marty
Course Title & #	Geology 130	Email	kevin.marty@imperial.edu (mailto:kevin.marty@imperial.edu)
CRN #	CRN: 20794	Webpage (optional)	
Room	Online (this semester)	Office	2772 (N/A this semester)
Class Dates	Feb 15-June 11	Office Hours	TBA
Class Days	Online	Office Phone #	760-355-5761 (N/A this semester)
Class Times	see above	Office contact if instructor will be out or emergency	Science Dept at 760-355-6155
Units	3		

ZOOM MEETINGS: this course is set up as traditional online (with no Zoom meetings required). I would like to change this (at least for the first few weeks of the semester) and meet through Zoom at least once each week to discuss and provide assistance with the course which includes forming two or three groups to work on the "PeerWise" assignments. We can discuss this beginning with an announcement and try to find a time and day of the week where we can all meet on Zoom (if only for 30 minutes).

ONE OTHER NOTE: THERE ARE A LOT OF LINKS TO THE LEFT BUT YOU ONLY NEED ONE TO WORK THROUGH THIS COURSE...AFTER LOOKING THROUGH THE SYLLABUS HERE, GO TO THE 'MODULES' LINK AND ALL OF THE LESSONS ARE PRESENTED HERE WITH LINKS TO ALL OF THE ASSIGNMENTS (SO YOU DON'T HAVE TO CLICK ON OTHER LINKS UNLESS YOU WANT TO EXPLORE)

PeerWise and Weather Journals

This has been a challenging course to get organized and ready for the online learning format (along with the other geology courses). For this semester, and for a large percentage of your grade, I seek your help in creating quizzes and assignments (and possibly other ancillary resources) as way for you to learn the material, and to benefit future Geology 130 courses. There are many ways to study the topics for a course; our approach this semester, while not common, can be just as effective as traditional methods in achieving our educational goals.

You may not have any or limited background/experience with college courses in science, but it isn't required. You are connected everyday, directly and indirectly, with the topics of interest in this course (e.g., the processes and features that result in the atmospheric phenomena that we observe or experience everyday). The requirement for this section of your class is your willingness to work with others to investigate and discuss the assigned chapters of the course textbook using various means of communication including Zoom group meetings; and to formulate challenging and relevant questions (using the platform 'PeerWise') from your understanding and observations on how weather and climate processes work.

PeerWise is a website dedicated to the creation of multiple choice quiz questions for instructors and students to interact; it's an alternative learning method that I feel can be effective if done in a teamwork environment where students are free to discuss topics and create. There will be guidelines through a grading rubric on the structure and content of your work; and resources to help you understand and meet these guidelines.

With the above being written, please keep in mind that this course design is new to me and I welcome your ideas and input into the use of PeerWise and it's implementation into our learning environment throughout this semester.

Grading: ~13 assignments @ 25 pts each: ~325 pts possible

Weather Journals: for the most part, while the group work associated with PeerWise will account for the highest percentage of your grade, the remainder of your grade will be based mostly on 6 weeks of Weather Journal entries. This will be an opportunity to keep a handwritten journal on the weather you experience and your connections to the atmosphere. See the "Modules" section for guidelines on the Weather Journals.

Grading: 6 journal entries @ 25 pts each: ~150 pts

General Course Structure (below is text taken from the online textbook's website/authors. METO 3 is the name of the course through a different college- at IVC the course is "Geol 130: Climate and Weather" -using resources from METEO 3).

METEO 3: INTRODUCTORY METEOROLOGY (3 credits). Nontechnical treatment of fundamentals of modern meteorology and the effects of weather and climate. Prerequisites: None

METEO 3 is a General Education course. The course is designed specifically for distance learners seeking general science credit. METEO 3 will introduce to you a wide variety of basic atmospheric concepts so that you can become a better "weather consumer" (better understand and evaluate weather information) and gain a better understanding of "how the weather works."

METEO 3 uses online text with digital video, audio, simulation models, virtual field trips to online data resources, and interactive quizzes that provide instantaneous feedback. The course consists of 13 lessons, plus a course orientation week at the beginning of the semester. Lessons consist of an online reading assignment, which includes interactive exercises, links, animations, movies, and supplementary explanations of basic scientific principles.

Course Objectives

When you successfully complete this course, you will be prepared to:

- describe the typical vertical variation of the basic variables used to quantify the atmospheric state, including temperature, pressure, humidity, winds, and natural and anthropogenic particles
- describe the basic techniques used by meteorologists (and other scientists) to gather and interpret atmospheric data
- discuss climate and climate change, together with the possible influences that humans have on diverse climate phenomena
- analyze the forces that drive three-dimensional atmospheric motions
- identify basic cloud types and discuss their formation mechanisms, together with the precipitation types and other materials that precipitation cleanses from the air
- describe a variety of large-scale atmospheric phenomena, including the extratropical cyclone, the jet stream, and the general circulation
- describe a variety of mesoscale and small-scale atmospheric phenomena, including tropical storms, severe thunderstorms, and tornadoes.

What will you learn in this course?

METEO 3 seeks to give you a better understanding of atmospheric structure and processes so you can better apply the weather information you encounter. With this knowledge of how the atmosphere works, you'll be able to understand what controls the evolution of storms and appreciate why weather forecasts are sometimes highly uncertain. You will also learn to "read" the sky so you can make your own short-term forecasts and adjust your behavior accordingly. You will also be better able to assess the validity of the commonly expressed concerns about climate change and deteriorating air quality.

Lesson 1: A Meteorologist's Toolbox (applications of meteorology, composition of the atmosphere, UTC and common U.S. time zones, temperature scales, observations and station models, common statistical measures (range, mean, and normal), map features (latitude lines, meridians and projections), reading isopleth maps, gradients)

Lesson 2: The Global Ledger of Heat Energy (electromagnetic spectrum, laws of radiation, radiation processes, albedo, energy budgets, radiation at the Earth's surface, clouds and radiation, greenhouse effect, conduction and convection)

Lesson 3: The Global and Local Controllers of Temperatures (seasonal changes, climatic temperature variations, vertical temperature variation, air masses and fronts, advection, diurnal temperature changes, measuring temperature)

Lesson 4: The Role of Water in Weather (hydrological cycle, water phase changes, evaporation rates, condensation rates, relative humidity, air "holding" water fallacy, cloud and fog formation, interpreting dew point temperature and relative humidity)

Lesson 5: Remote Sensing of the Atmosphere (remote sensing versus in-situ measurements, polar orbiting versus geostationary satellites, cloud types, visible imagery, IR imagery, water vapor imagery, weather radar)

Lesson 6: Surface Patterns of Pressure and Wind (atmospheric pressure, "station pressure" vs "sea-level pressure", decoding station model pressure, wind (forces, direction at surface and aloft), convergence and divergence, troughs and ridges)

Lesson 7: Mid-Latitude Weather Systems (upper-air patterns and the jet stream, convergence / divergence effect on surface pressure, mid-latitude cyclones (development, features, weather, conveyor belts), types of winter precipitation, winter weather safety)

Lesson 8: Stability and Thunderstorms (hydrostatic equilibrium, vertical velocity, buoyancy and stability, clouds vs stability, lightning (formation and safety tips), thunderstorms (climatology, types, terms and life cycle)), lake-effect snow and snow squalls.

Lesson 9: Severe Weather (flash floods, hail, microbursts, watches and warnings, squall line, derecho, bow echo, tornadoes (climatology, supercells, terms, radar signature, safety, Fujita scale, myths), other vortices)

Lesson 10: The Human Impact on Weather and Climate (local and regional-scale anthropogenic climate-change drivers (urbanization, deforestation, etc.), natural causes of climate change (solar cycles, volcanoes, orbital changes, ocean cycles), anthropogenic climate change (terms, processes, impacts), carbon-cycle, Earth's temperature record, global warming impacts, global warming and extreme weather, general circulation models, ozone layer, ozone hole)

Lesson 11: Patterns of Wind, Water, and Weather in the Tropics (tropics importance to general circulation, Hadley circulation, ITCZ, subtropical high pressure regions, Trade Winds, subtropical jet stream, Asian Summer Monsoon, El Niño (and La Niña), teleconnections)

Lesson 12: Hurricanes (tropical cyclone terms, hurricane climatology, tropical-cyclone naming conventions, ingredients for tropical cyclone formation and processes for strengthening, land-falling hurricane impacts, assessing hurricane damage potential)

Lesson 13: Becoming a Savvy Weather Consumer (historical perspective on how weather forecasts are made, computer models and their sources of error, ensemble forecasting, assessing forecast accuracy, common sources of weather forecasts, forecast scenarios with great uncertainty, finding trusted sources of weather information on social media)

How does this course work?

METEO 3 uses an online text, which includes digital video, audio, simulation models, virtual field trips to on-line data resources, and interactive quizzes that provide instantaneous feedback. The course consists of 12 lessons, plus a course orientation week at the beginning of the semester. Lessons consist of an online reading assignment, along with online interactive exercises, links, animations, movies, and supplementary explanations of basic scientific principles.

For "Geology 130: Climate and Weather", we will use the material from METEO 3 as the main resource for our course and completing the following tasks:

I. Developing quizzes/short answer questions that are peer (and instructor) reviewed.

II. Keeping a 'weather journal' over 10 weeks of the course.

III. Completing a course survey at the end of the semester that addresses your experience this semester; the effectiveness of our learning approach and ideas for change and improvement.

Anticipated Weekly Schedule for Spring 2021 (followed under the 'Modules' link to the left)

Week of:	Module/Topic	Task
Feb 15-21	Orientation; Seasons	Quiz and Discussion Post
Feb 22-28 (Lesson 1)	Lesson 1: A Meteorologist's Toolbox	Create Quiz/Test Questions
Mar 1-7 (Lesson 2)	Lesson 2: The Global Ledger of Heat Energy Weather Journal 1	Create Quiz/Test Questions
Mar 8-14 (Lesson 3)	Lesson 3: Global and Local Controllers of Temperature	Create Quiz/Test Questions
Mar 15-21 (Lesson 4)	Lesson 4: The Role of Water in Weather Weather Journal 2	Create Quiz/Test Questions
Mar 22-28 (Lesson 5)	Lesson 5: Remote Sensing of the Atmosphere Peer Evaluation	Create Quiz/Test Questions
Mar 29-Apr 4 (Lesson 6)	Lesson 6: Surface Patterns of Pressure and Wind Weather Journal 3 Weather Journal Check!!	Create Quiz/Test Questions

Apr 5-11	Spring Break	Spring Break
Apr 12-18 (Lesson 7)	Lesson 7: Mid-Latitude Weather Systems Weather Journal 4	Create Quiz/Test Questions
Apr 19-25 (Lesson 8)	Lesson 8: The Role of Stability in Thunderstorm Formation	Create Quiz/Test Questions
Apr 26-May 2 (Lesson 9)	Lesson 9: Severe Weather Weather Journal 5	Create Quiz/Test Questions
May 3-9 (Lesson 10)	Lesson 10: The Human Impact on Weather and Climate Peer Evaluation	Create Quiz/Test Questions
May 10-16 (Lesson 11)	Lesson 11: Patterns of Wind, Water and Weather in the Tropics Weather Journal 6	Create Quiz/Test Questions
May 17-23 (Lesson 12)	Lesson 12: Hurricanes	Create Quiz/Test Questions
May 24-30 (Lesson 13)	Lesson 13: Becoming a Savvy Weather Consumer	Create Quiz/Test Questions
May 31-June 6 (Lesson 14)	Climate Studies Weather Journal Due!!	Climate Studies

June 7-11 (Final's Week)	course survey due	last week!
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Student Learning Outcomes

Upon course completion, the successful student will have acquired new skills, knowledge, and or attitudes as demonstrated by being able to:

1. Gain critical thinking skills while working on and completing weekly homework assignments which include applying methods such as Venn diagrams, rubrics, and concept maps. (ILO2)
2. Gain awareness of geological events, weather and climate patterns and oceanic circulation on a global scale and understand/evaluate why events/features occur where they do. Assessment done through various homework assignments. (ILO5)
3. Gain knowledge of geological, meteorological, astronomical and oceanic features and processes through lectures, research papers, exams and presentations. Ties to all objectives. (ILO4)

Course Summary:

Date	Details	Due
Mon Feb 22, 2021	 <u>Is Climate Change affecting our Seasons?; INITIAL AND RESPONSE POSTS DUE END OF WEEK</u> https://imperial.instructure.com/courses/14821/assignments/332770	due by 11:59pm
	 <u>Season's Assignment (Quiz) DUE END OF WEEK</u> https://imperial.instructure.com/courses/14821/assignments/330465	due by 11:59pm
Sun Feb 28, 2021	 <u>Group 2: Submit Short Answer/Essay Style (Chapter Review; Critical Thinking) Questions Here</u> https://imperial.instructure.com/courses/14821/assignments/333673	due by 11:59pm
Sun Mar 7, 2021	 <u>Group 1: Submit Short Answer/Essay Style (Chapter Review; Critical Thinking) Questions Here</u> https://imperial.instructure.com/courses/14821/assignments/332898	due by 11:59pm
	 <u>Weather Journal Entry (submit here); REQUIRED but not graded until the final submittal on June 6</u> https://imperial.instructure.com/courses/14821/assignments/336278	due by 11:59pm
Sun Mar 14, 2021	 <u>Group 2: Submit Short Answer/Essay Style (Chapter Review; Critical Thinking) Questions Here</u> https://imperial.instructure.com/courses/14821/assignments/333793	due by 11:59pm

Date	Details	Due
Sun Mar 21, 2021	📄 Group 1: Submit Short Answer/Essay Style (Chapter Review; Critical Thinking) Questions Here (https://imperial.instructure.com/courses/14821/assignments/333794)	due by 11:59pm
	📄 Weather Journal Entry (submit here); REQUIRED but not graded until the final submittal on June 6 (https://imperial.instructure.com/courses/14821/assignments/336378)	due by 11:59pm
Sun Mar 28, 2021	📄 Group 2: Submit Short Answer/Essay Style (Chapter Review; Critical Thinking) Questions Here (https://imperial.instructure.com/courses/14821/assignments/335633)	due by 11:59pm
	📄 Group 1: Submit Short Answer/Essay Style (Chapter Review; Critical Thinking) Questions Here (https://imperial.instructure.com/courses/14821/assignments/335645)	due by 11:59pm
Sun Apr 4, 2021	📄 Weather Journal Entry (submit here); REQUIRED but not graded until the final submittal on June 6 (https://imperial.instructure.com/courses/14821/assignments/336379)	due by 11:59pm
	📄 Group 2: Submit Short Answer/Essay Style (Chapter Review; Critical Thinking) Questions Here (https://imperial.instructure.com/courses/14821/assignments/335648)	due by 11:59pm
Sun Apr 18, 2021	📄 Weather Journal Entry (submit here); REQUIRED but not graded until the final submittal on June 6 (https://imperial.instructure.com/courses/14821/assignments/336380)	due by 11:59pm
	📄 Group 1: Submit Short Answer/Essay Style (Chapter Review; Critical Thinking) Questions Here (https://imperial.instructure.com/courses/14821/assignments/335651)	due by 11:59pm
Sun Apr 25, 2021	📄 Group 2: Submit Short Answer/Essay Style (Chapter Review; Critical Thinking) Questions Here (https://imperial.instructure.com/courses/14821/assignments/335654)	due by 11:59pm
	📄 Weather Journal Entry (submit here); REQUIRED but not graded until the final submittal on June 6 (https://imperial.instructure.com/courses/14821/assignments/336381)	due by 11:59pm
Sun May 2, 2021	📄 Group 1: Submit Short Answer/Essay Style (Chapter Review; Critical Thinking) Questions Here (https://imperial.instructure.com/courses/14821/assignments/335657)	due by 11:59pm
	📄 Group 2: Submit Short Answer/Essay Style (Chapter Review; Critical Thinking) Questions Here (https://imperial.instructure.com/courses/14821/assignments/335667)	due by 11:59pm
Sun May 9, 2021	📄 Group 2: Submit Short Answer/Essay Style (Chapter Review; Critical Thinking) Questions Here (https://imperial.instructure.com/courses/14821/assignments/335667)	due by 11:59pm
Sun May 16, 2021	📄 Group 2: Submit Short Answer/Essay Style (Chapter Review; Critical Thinking) Questions Here (https://imperial.instructure.com/courses/14821/assignments/335667)	due by 11:59pm

Date	Details	Due
	 Weather Journal Entry (submit here); REQUIRED but not graded until the final submittal on June 6 (https://imperial.instructure.com/courses/14821/assignments/336382)	due by 11:59pm
Sun May 23, 2021	 Group 1: Submit Short Answer/Essay Style (Chapter Review; Critical Thinking) Questions Here (https://imperial.instructure.com/courses/14821/assignments/335668)	due by 11:59pm
Sun May 30, 2021	 Group 2: Submit Short Answer/Essay Style (Chapter Review; Critical Thinking) Questions Here (https://imperial.instructure.com/courses/14821/assignments/335674)	due by 11:59pm
Sun Jun 6, 2021	 Completed Weather Journal Submitted Here (https://imperial.instructure.com/courses/14821/assignments/333640)	due by 11:59pm
Thu Jun 10, 2021	 COURSE SURVEY (https://imperial.instructure.com/courses/14821/assignments/336248)	due by 11:59pm
	 Peer Evaluation Form and Place to Submit Evaluations (https://imperial.instructure.com/courses/14821/assignments/332887)	
	 Weather Observation Journal (https://imperial.instructure.com/courses/14821/assignments/331036)	