

## GEO3250 CLIMATOLOGY

3 Credit Hours      Spring 2023      Primary General Education Designation: Physical Science (P)

**INSTRUCTOR:** Dr. Corene Matyas [matyas@ufl.edu](mailto:matyas@ufl.edu) (Please *ONLY* email via Canvas)

*All office visits are virtual through zoom    meeting ID 672 215 8470*

**OFFICE HOURS:**      *Wednesday 10:00-11:00 am, Friday 12:00-1:00 pm; by advance appointment (24 hours notice appreciated) (business hours only - no evenings or weekends)*

**COURSE WEBSITE:**    *<http://lss.at.ufl.edu> (100% online asynchronous course)*

*This course is **asynchronous**. The only whole-class synchronous activities are the review sessions for the midterm and final exams. These will be recorded and available for you to review in Canvas. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.*

### **Course Communications:**

I was requested to design a rigorous course with lectures, textbook readings, and a variety of assignments that include group and solo work. The Southern Association of Colleges and Schools Commission on Colleges provides this definition of a credit hour: A credit hour is the amount of work represented in “not less than one hour of classroom or direct faculty instruction and a **minimum** of two hours out of class student work each week for approximately fifteen weeks for one semester or trimester hour of credit ...” This is a 3-credit course, so expect to put in up to 9 hours of work each week. This course is NOT an “easy A”. It is an intermediate-level course that builds on pre-requisite introductory knowledge of atmospheric science.

You WILL have questions! Each week’s module has a discussion board. First, read through other posts to see if your question has been answered. Second, if not, post your question. Third, read through and answer questions of other students. The instructor will not respond to every post and will not respond on the weekends. Therefore, you MUST start early and not wait until the due date. Also, there are homework assignments that require you to participate in your GROUP discussion board. This is a separate post from any general questions that you may post to the whole class on the weekly discussion boards.

I am here to help! If no one has answered your question or you need to speak to me about your grade, please email me via Canvas with a time(s) when we can connect on Zoom and I will confirm. Please include a bulleted

list of topics for discussion so I am well-prepared to help you. I cannot answer detailed questions via typing. I reserve the right to limit the number of hours I spend responding to student inquiries each week.

For exam review sessions, I will send out invites to the Zoom Conference tool. These sessions will be recorded. However, if no one logs in after I finish introducing the session, I will stop recording until someone does. There is no point in listening to silence for an hour! If you cannot attend live, please submit questions on the discussion board as I will review and answer these during the review sessions.

The KEYS to your success are 1) good time management skills, 2) familiarity with prerequisite concepts, 3) good attitude about pursuing and overcoming challenges, and 4) regular participation via discussion boards, office hours, and self-organized study groups is needed. Download the homework and skim it over before watching the intro video each week. In the video, I spend several minutes going over the homework and provide tips to help you achieve success. Each semester I've modified the assignments according to student feedback, and I welcome your continued feedback! Follow along with the homework in front of you and if something doesn't make sense, make a note and post your question to the discussion board right away. That gives me the maximum amount of time to help you. Here is what NOT to do: wait until 11:00 pm to start an assignment due at 11:59 pm. No one is available to help if you have questions! I recommend watching the lecture videos before reading the textbook as the videos provide background material.

Also, I will review most frequently missed questions each week. As this course builds upon previous weeks' information, it is important to understand that material. So please take the time to listen to the audio posts and also to read feedback on assignments that I've made using tools in Canvas. The most-missed concepts are likely to appear on the exams.

**REQUIRED TEXT:** Climatology (4th edition) by Rohli and Vega ISBN-10:128411998X

Printer/scanner for homework assignments and exam diagrams, zip images together into one file for upload, use Microsoft Office (word, excel, PowerPoint), ability to record presentation for research project

**ADDITIONAL RESOURCES:** microphone on computer to communicate with instructor during virtual office hours, ability to use drawing tools in MS Word for diagrams on exams, making data tables and using formulas in MS Excel, making presentations in MS PowerPoint

**COURSE DESCRIPTION:** *Credits: 3;*

Climatology in a global context. Emphasizes energy budgets, weather systems in the tropics and extratropics, and atmospheric teleconnections such as El Nino.

#### **GENERAL EDUCATION OBJECTIVES**

<https://undergrad.aa.ufl.edu/general-education/gen-ed-courses/structure-of-gen-ed-courses/slos-and-performance-indicators/student-learning-outcomes/>

<https://undergrad.aa.ufl.edu/general-education/gen-ed-courses/structure-of-gen-ed-courses/slos-and-performance-indicators/performance-indicators/>

A minimum grade of C is required for general education credit

**PREREQUISITE KNOWLEDGE AND SKILLS:** Previous undergraduate course in weather and climate (MET1010 preferred, GEO2242) or personal knowledge of that material

**This is not an introductory course.** We will NOT cover basic fundamentals of atmospheric science such as the difference between high and low pressure systems, the type of weather associated with each, and how a cloud forms. We build on these concepts to understand the components of the climate system, how energy moves through the system, and system changes over space and time. If needed, you must be willing to put in extra time to understand terminology or processes that are the foundations upon which this course is built.

**PURPOSE OF COURSE:** Climate change is a “hot” topic today. This course will provide you with a scientific understanding of the climate system and the processes that operate through it. Your goal is to develop an awareness of your physical environment as it relates to climatology so that you can apply knowledge gained in the real world. Students enroll in this course from a variety of majors: Engineering, Environmental Science, Journalism, Business, Sociology, English, Geological Sciences, Chemistry, and of course Geography among others. Many students tell me they take the course because they “love the weather.” This course will challenge you to communicate scientific information to these students majoring across the physical and social sciences and humanities. It also qualifies for undergraduate and graduate certificates.

**COURSE GOALS AND/OR OBJECTIVES:** *By the end of this course, students will:*

- Define the field of climatology and components of the climate system
- Recount the limitations of observational data both currently and in the past
- Describe where energy comes from and trace its movement through the climate system
- Analyze the controls of the climate system and detail how they work
- Compare and contrast atmospheric conditions differ in the tropics and the extratropics
- Illustrate why and how the climate system changes over time
- Represent processes and energy flows through diagrams and symbology commonly used by atmospheric scientists

#### **HOW THIS COURSE RELATES TO STUDENT LEARNING OUTCOMES FOR PHYSICAL SCIENCE GENERAL EDUCATION**

- Content: Students will demonstrate competence in the terminology, concepts, methodologies and theories of the atmospheric processes that comprise the climate system (quizzes, homework assignments, exams, research project).

- **Critical Thinking:** Students will analyze information relevant to the physical processes that drive the climate system and apply interpretation of data toward problem solving (homework assignments, research project).
- **Communication:** Students will interpret and effectively communicate information relevant to physical processes in the climate system in written (verbal and diagrammatically) form (homework assignments, examinations) and oral form (presentation on research project).

### **INSTRUCTIONAL METHODS:**

*Modules 1-7 feature textbook readings and video lectures that expand upon the readings, or emphasize material not covered in the book. This half of the course provides the foundation that you will need to be successful in the second part of the course. Video lectures do NOT repeat content in the textbook – rather they provide recaps of prerequisite knowledge to help understand the book.*

*Modules 8-13 have textbook readings but do not have accompanying lectures- the second part of the course focuses on applying what you learned in the first half. The book covers the material that you need to know, therefore no additional lectures are needed. In lieu of lectures and associated quizzes, you will undertake a research project – more details will be released through Canvas.*

### **COURSE POLICIES:**

**ATTENDANCE POLICY:** You must log into Canvas regularly to participate in this course. Logging in once per week will NOT be sufficient. No points towards the grade are reserved solely for your virtual attendance. Students who withdraw from the course must do so according to the UF deadlines. No students will be automatically dropped from the course.

**QUIZ/EXAM POLICY:** Quizzes and exams have with a mix of multiple choice, true/false, short answer, and fill in the blank questions. You should NOT work with anyone else. Exams will have sections for me to hand grade – you will need to either 1) use drawing tools in MS Word and type in answers where required, or 2) download the worksheets, fill them in, then scan and upload before the time expires. Please allow a minimum of 3 business days after the due date for grades to become available. You have one week after grades are released to arrange a time discuss results with the instructor or request a regrade. If you request a regrade, your score may go up or down.

**MAKE-UP POLICY:** No late homework will be accepted as you have one week to work on each assignment. Please budget your time well. Unless official documentation of an absence is presented (police report, ticket number from IT), NO MAKE-UP QUIZZES or EXAMS will be permitted. Quizzes and exams open and close at scheduled times. Once closed, they will not be reopened. Do not wait until the last hour before it is due! If something comes up, please contact me ASAP to discuss your situation.

**ASSIGNMENT POLICY:** Due dates for assignments are listed on Canvas. Late assignments will NOT be accepted – please submit before the due date each week. Rubrics for applicable homework assignments are available on the assignment’s page in Canvas. You will work in groups for some assignments, and work individually on

others. You must ALWAYS turn in your own work, else you are guilty of an honor code violation. Some assignments are assessed through quizzes. You MUST have your completed homework assignment handy and use your work to answer the quiz questions. Please allow a minimum of 3 business days after the due date for grades to become available. You have one week after grades are released to arrange a time discuss results with the instructor or request a regrade. If you request a regrade, your score may go up or down.

**COURSE TECHNOLOGY:** You will be watching lecture videos for the first half of the class. You will need to record yourself giving a PowerPoint presentation for the research project. You will also need to download homework assignments and in some cases, hand-write information and scan or take a photo of your results and upload to Canvas. We will use the Zoom Conference tool in Canvas for review sessions prior to the midterm and final exams. Office hours will all be conducted via Zoom as will individually-requested meetings with the instructor.

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.

#### UF POLICIES:

**UNIVERSITY POLICY ON ACCOMMODATING STUDENTS WITH DISABILITIES:** Students requesting accommodation for disabilities must first register with the Dean of Students Office (<http://www.dso.ufl.edu/drc/>). The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation. You must submit this documentation prior to submitting assignments or taking the quizzes or exams. A minimum of one week is needed for the instructor to find ways to provide the accommodation. Accommodations are not retroactive, therefore, students should contact the office as soon as possible in the term for which they are seeking accommodations.

**UNIVERSITY POLICY ON ACADEMIC MISCONDUCT:** Academic honesty and integrity are fundamental values of the University community. UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class. Each suspected honor code violation will be reported to the Dean of Students Office.

**NETIQUETTE: COMMUNICATION COURTESY:** All members of the class are expected to follow rules of common courtesy in all email messages, discussion posts and chats. First instance of improper behavior will receive a warning. Subsequent instances may result in a lowering of the course grade. [See Sample Netiquette Document](#)

**COURSE EVALUATIONS:** Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://gatorevals.aa.ufl.edu/>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://gatorevals.aa.ufl.edu/>.

#### GETTING HELP:

For issues with technical difficulties for E-learning in Canvas, please contact the UF Help Desk at:

- [Learning-support@ufl.edu](mailto:Learning-support@ufl.edu)
- (352) 392-HELP - select option 2
- <http://helpdesk.ufl.edu>

Any requests for make-ups due to technical issues MUST be accompanied by the ticket number received from LSS when the problem was reported to them. The ticket number will document the time and date of the problem. You MUST e-mail your instructor within 24 hours of the technical difficulty if you wish to request a make-up.

Other resources are available at <http://www.distance.ufl.edu/getting-help> for:

- Counseling and Wellness resources
- Disability resources
- Resources for handling student concerns and complaints
- Library Help Desk support

Should you have any complaints with your experience in this course please visit <http://www.distance.ufl.edu/student-complaints> to submit a complaint.

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu) so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

**GRADING POLICIES:**

Assignment	Percentage
Homework Assignments	35
Textbook Chapter Quizzes	20
Lecture Quizzes	15
Midterm Exam	10
Final Exam	10
Research Project	10

**GRADING SCALE:** (grades do not round)

- A: 93% +
- A-: <93% to 90%
- B+: <90% to 87%
- B: <87% to 83 %
- B-: <83% to 80%
- C+: <80% to 77%
- C: <77% - 73%
- C- : <73% to 70%
- D+: <70% to 67%
- D: <67% to 63%
- D- : <63% to 60%
- E: < 60%

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

**INFORMATION ON CERTIFICATES:**

So long as you receive a grade of B- or higher, this course counts as 25% of the credits needed for the undergraduate certificate: Meteorology and Climatology, or 33% of the credits needed for the graduate certificate Applied Atmospheric Science. If you are interested in pursuing the certificate, you must apply to join it by going to <http://admissions.ufl.edu/start.html> and scrolling down to the section for CERTIFICATE. Select the current term, NOT the term you wish to graduate! There is no charge to apply if you are already a UF student. If you have applied but don't see that you are enrolled in the certificate on your degree audit after 3 weeks have passed, please email me as the Certificate Coordinator so I can check into the problem. I have

uploaded fliers to Canvas that list all certificate courses. Once finished with certificate courses, you must log onto ONE.UF and apply to graduate from the certificate.

## RUBRIC FOR RESEARCH PRESENTATION

### Rubric for Research Presentation

Name: \_\_\_\_\_

Quality	Missing or Unacceptable (0)	Needs Major Improvement (1)	Needs minor improvement (2)	Good (3)
<b>Introduction</b>				
Summarized main objective (s)				
Importance of problem detailed				
<b>Data</b>				
Spatial/temporal resolutions and units provided				
Appropriate to support objective(s)				
<b>Methods</b>				
Appropriate details provided as to how data are analyzed to derive results from journal article				
<b>Results and Conclusions</b>				
Results from article interpreted correctly				
Figures and/or tables relevant and explained clearly				
<b>Overall</b>				
Proper terminology used				
Sources appropriate and correctly cited on slide at end				
Duration 4-5 minutes				
Text is bulleted/ not sentences; content is appropriate				
Did not just read from the slides				
<b>Sum for each column:</b>	X 0	X 1	X 2	X 3

**Total score (add multiplied column sums):** \_\_\_\_\_



## COURSE SCHEDULE, TOPICS COVERED, AND WEEKLY ASSESSMENTS:

Disclaimer: This syllabus represents my current plans and objectives. As we go through the semester, those plans may need to change to enhance the class learning opportunity. Such changes, communicated clearly, are not unusual and should be expected.

### MODULE 1: INTRODUCTION TO THE CLIMATE SYSTEM

#### OBJECTIVES

- Categorize the elements that comprise the components of our climate system
- Determine which sub-fields of climatology are used to study each component
- Construct a diagram that represents the components in the climate system

#### TO DO LIST

1. Watch lectures
2. Read Textbook Chapter 1 (p 3-10)
3. Participate in the Module 1 Textbook and Lecture Questions discussion board.
4. Take Lecture Quiz
5. Participate in Module 1 Group Discussion Board: Components of the Climate System

#### ASSESSMENTS

- Module 1 Lecture Quiz
- Module 1 Group Discussion Board: Components of the Climate System

### MODULE 2: RADIATION AND ATMOSPHERIC STRUCTURE

#### OBJECTIVES

- Calculate radiation properties using equations based on the concept of a blackbody.
- Compare and contrast the radiation emitted by several stars and the earth.
- Explain how to relate radiation laws to graphs of data that use them.
- Contrast the layers of Earth's atmosphere.

#### TO DO LIST

1. Download and review Homework: Working with Radiation Laws
2. Watch lecture
3. Read Textbook Chapter 2 p 11-23
4. Participate in the Module 2 Textbook and Lecture Questions discussion board.
5. Take Lecture Quiz
6. Take Textbook Quiz
7. Participate in the Module 2 Homework Questions discussion board.
8. Complete Individual Homework: Working with Radiation Laws

#### ASSESSMENTS

- Module 2 Textbook Quiz
- Module 2 Lecture Quiz
- Module 2 Homework

## MODULE 3: ENERGY

### OBJECTIVES

- Calculate the energy budget for a given location on Earth
- Compare the sources of energy gained and lost at Earth's surface and in the atmosphere
- Discuss how components of the energy budget vary given differences in land surface conditions or time of year
- Critique the values used in the energy budget for a given location and the justification for those values as provided by other group members

### TO DO LIST

1. Download and review homework: Energy Budget Assignment
2. View lectures
3. Read Textbook Chapter 5 (p 79-93)
4. Participate in the Module 3 Textbook and Lecture Questions discussion board.
5. Complete Lecture Quiz
6. Complete Textbook Quiz
7. Participate in the Module 3 Homework Questions discussion board
8. Complete Energy Budget Assignment

### ASSESSMENTS

- Module 3 Textbook Quiz
- Module 3 Lecture Quiz
- Module 3 Group and Individual Assignment: Energy Budget

## MODULE 4: CONTROLS ON THE CLIMATE SYSTEM

### OBJECTIVES

- Generate hypotheses about how climate system controls influence temperature at different locations on Earth
- Interpret data related to sea level pressure and geopotential heights
- Diagram the forces that can combine to determine wind direction and speed in the horizontal direction at different layers of the atmosphere

### TO DO LIST

1. Download and review Homework: Force Diagrams
2. View lectures
3. Read Textbook Chapter 3 p. 25-50
4. Participate in the Module 4 Textbook and Lecture Questions discussion board.
5. Complete Lecture Quiz
6. Complete Textbook Quiz
7. Participate in Module 4 Discussion Board: Force Diagrams
8. Complete Homework

### ASSESSMENTS

- Module 4 Textbook Quiz
- Module 4 Lecture Quiz
- Module 4 Homework

## MODULE 5: DIURNAL CYCLE, MOISTURE, AND STABILITY

### OBJECTIVES

- Identify the radiative components of the energy budget affecting air temperatures in the boundary layer over a diurnal cycle.
- Hypothesize what would happen to temperatures in the boundary layer under different moisture and stability conditions and explain why and how this would happen.

### TO DO LIST

1. Download and review Homework: Temperature Variation with Elevation
2. View lectures
3. Read Textbook Chapter 5 (p 93-103, stop before gradient Richardson number.
4. Participate in the Module 5 Textbook and Lecture Questions discussion board.
5. Complete Lecture Quiz
6. Complete Textbook Quiz
7. Participate in Module 5 Discussion Board: Temperature Variation with Elevation
8. Complete Module 5 Homework
9. Review the Mid-term Exam General Questions Discussion Board.

### ASSESSMENTS

- Module 5 Textbook Quiz
- Module 5 Lecture Quiz
- Module 5 Homework

## MODULE 6: PRECIPITATION AND WATER BALANCE

### OBJECTIVES

- Calculate values of potential evaporation, deficit, and soil moisture to monitor water balance
- Construct a graph of the annual water balance
- Compare deficits and soil moisture utilization for an average year and a drought year
- Hypothesize when a flood event occurred and the rainfall intensity and duration associated with the event given observed data

### TO DO LIST

1. Download and review Module 6 Homework Instructions and Excel Worksheet
2. View lecture
3. Read Textbook Chapter 6 (p 107-129)
4. Participate in the Module 6 Textbook and Lecture Questions discussion board.
5. Complete Lecture Quiz
6. Complete Textbook Quiz
7. Participate in the Module 6 Homework Questions discussion board
8. Complete Assignment: Water Balance, Drought, and Flood

- Review the Mid-term Exam General Questions Discussion Board.

#### ASSESSMENTS

- Module 6 Textbook Quiz
- Module 6 Lecture Quiz
- Module 6 Assignment: Water Balance, Drought, and Flood

## MODULE 7: PRIMARY AND SECONDARY CIRCULATIONS

#### OBJECTIVES

- Compare atmospheric features from the realms of climatology and meteorology
- Construct a composite map of key features pertaining to atmospheric circulation
- Explain how features of the secondary circulation change over space to produce the patterns that we observe
- Hypothesize conditions present at Earth's surface given conditions present at 500 mb and vice versa

#### TO DO LIST

- Download and review Homework: Identifying Circulation Features
- View lectures
- Read Textbook Chapter 7 (p 131-153)
- Participate in the Module 7 Textbook and Lecture Questions discussion board.
- Complete Lecture Quiz
- Complete Textbook Quiz
- Participate in the Module 7 Homework Questions discussion board
- Complete Assignment: Identifying Circulation Features
- Review the Mid-term Exam General Questions Discussion Board.

#### ASSESSMENTS

- Module 7 Textbook Quiz
- Module 7 Lecture Quiz
- Module 7 Assignment: Identifying Circulation Features

## Midterm Exam: Week 8

## MODULE 8: CLIMATE CLASSIFICATION AND START RESEARCH PROJECT

#### OBJECTIVES

- Compare and contrast the climate classification methods
- Analyze long-term (30 year) data to determine the climate classification of a location
- Evaluate and compare conditions at different locations using different climate classification techniques
- Identify air mass source regions

#### TO DO LIST

- Download and review Homework: Performing Climate Classifications
- Read Textbook Chapter 8 (p. 155-174)
- Participate in the Module 8 Textbook Questions discussion board.

4. Complete Module 8 Textbook Quiz
5. Participate in the Module 8 Homework Questions discussion board
6. Complete Individual Homework: Performing Climate Classifications
7. Read guidelines for the Research Project.
8. Participate in the Research Discussion Board Topic Brainstorming.
9. Cast your vote in the Research Topic Voting Survey.

#### **ASSESSMENTS**

- Module 8 Textbook Quiz
- Module 8 Homework

## **MODULE 9: CLIMATE CHANGE AND VARIABILITY**

#### **OBJECTIVES**

- Identify trends in climatic conditions from thousands of years ago relative to today
- Evaluate proxy data used to determine Earth's past climate
- Match cycles in natural variability to trends in temperature
- Explain how cycles of natural variability contribute to changes in climate conditions

#### **TO DO LIST**

1. Download and review Homework: Natural Climate Variability
2. Read Textbook Chapter 11 (p 273-297)
3. Participate in the Module 9 Textbook Questions discussion board.
4. Complete Module 9 Textbook Quiz
5. Participate in the Module 9 Homework Questions discussion board
6. Complete Module 9 Homework
7. Sign up for a research topic

#### **ASSESSMENTS**

- Module 9 Textbook Quiz
- Module 9 Homework

## **MODULE 10: ANTHROPOGENIC CLIMATE CHANGE**

#### **OBJECTIVES**

- Match rates of glacial retreat to the timeline of Earth's recent temperature change
- Classify air pollutants and contributions to the Air Quality Index
- Hypothesize why the Air Quality Index changes given a set of conditions
- Identify activities contributing to global warming and global dimming

#### **TO DO LIST**

1. Download and review Homework: Air Quality
2. Continue work on Research Project
3. Read textbook Chapter 12 (p 301-321)
4. Participate in the Module 10 Textbook Questions discussion board.
5. Complete the Module 10 Textbook Quiz

6. Participate in the Module 10 Homework Questions and City Claim discussion board
7. Complete Module 10 Homework: Air Quality

#### ASSESSMENTS

- Module 10 Textbook Quiz
- Module 10 Homework: Air Quality

## MODULE 11: INTERACTIONS WITH OTHER SPHERES

#### OBJECTIVES

- Interpret maps of atmospheric and oceanic data
- Diagram forces that combine to determine surface ocean currents and vertical circulations in the atmosphere and ocean
- Distinguish between atmospheric and oceanic conditions present during the different phases of ENSO

#### TO DO LIST

1. Download and review Homework: Diagramming Influence of Walker Circulation and Coriolis Force on Ocean Circulation and Applications to ENSO
2. Read Textbook Chapter 4 (p 53-75)
3. Participate in the Module 11 Textbook Questions discussion board.
4. Complete Module 11 Textbook Quiz
5. Participate in the Module 11 Homework Questions discussion board
6. Complete Module 11 Homework
7. Complete and submit videos for the Research Project
8. Review the Final Exam General Questions Discussion Board.

#### ASSESSMENTS

- Module 11 Textbook Quiz
- Module 11 Homework
- Research Project

## MODULE 12: EXTRATROPICAL NORTHERN HEMISPHERE CLIMATES

#### OBJECTIVES

- Compare and contrast the climate types present on each continent
- Describe the unique features of North America that lead to its high prevalence of severe weather
- Identify local features that contribute to the climate of a location including prevailing winds, topography, ocean current, and continentality
- Interpret climographs and water budget charts to determine which climate type a city experiences

#### TO DO LIST

1. Read Textbook Chapter 9 (p. 179-226)
2. Participate in the Module 12 Textbook Questions discussion board.
3. Take Module 12 Textbook Quiz
4. All students should watch videos and review and comment on Discussion Board for Videos from Group 1 and Discussion Board for Videos from Group 2.

5. Take Quiz on Videos from Groups 1 and 2
6. Review the Final Exam General Questions Discussion Board.

#### **ASSESSMENTS**

- Module 12 Textbook Quiz
- Discussion Board for Videos from Group 1 and Discussion Board for Videos from Group 2.
- Quiz on Videos from Groups 1 and 2

## **MODULE 13: TROPICAL AND SOUTHERN HEMISPHERE CLIMATES**

#### **OBJECTIVES**

- Compare and contrast the climate types present on each continent
- Identify local features that contribute to the climate of a location including prevailing winds, topography, ocean current, and continentality
- Interpret climographs and water budget charts to determine which climate type a city experiences
- Describe the unique climate types of the tropics and Southern Hemisphere, especially Antarctica

#### **TO DO LIST**

1. Read textbook Chapter 10 (p. 229-268)
2. Participate in the Module 13 Textbook Questions discussion board.
3. Complete Module 13 Textbook Quiz
4. Discussion Board for Videos from Group 3 and Discussion Board for Videos from Group 4.
5. Take Quiz on Videos from Groups 3 and 4
6. Review the Final Exam General Questions Discussion Board.

#### **ASSESSMENTS**

- Module 13 Textbook Quiz
- Discussion Board for Videos from Group 3
- Discussion Board for Videos from Group 4
- Quiz on Videos from Groups 3 and 4

## **Final Exam (final exam week)**