Instructor: Dr. Andrea Allan
112 Burt Hall
aallan@coas.oregonstate.edu

Office Hours: Weds 11AM–12PM or by appointment

Class Schedule:
Lecture: MWF, 3:00–3:50 PM, Strand Ag 161
Lab: Th 4:00–5:20 PM, Wilkinson 129

Teaching Assistant: Ben Young
Wilkinson 007
riddellb@oregonstate.edu

TA’s Office Hours: Mon 1-2PM in 007 Wilkinson

Course web site: Canvas

Required Text: Understanding Weather and Climate, 6th ed. (Aguado and Burt)
Required Lab Book: Exercises for Weather and Climate, 9th ed (Carbone)
*Information on how to obtain these materials will be provided on the first day of class.

Course Description:
Systematic analysis of global and regional climates. Physical principles of climate, climate classifications, and distribution and characteristics of climate regimes. Lec/lab. (Writing Intensive Course)
Prerequisites: GEOG 102 [D-] or GEO 202 [D-] or GEO 102 [D-].

Course Objectives:
The objective of this course is to introduce students to the processes of climate formation; the distribution of climates over the Earth; the processes and evidence for climate change. Topics will include: atmospheric composition and structure, solar radiation, energy balance, atmospheric pressure and moisture, precipitation processes, atmospheric circulation, Earth’s climates, climate classification, water balance, vegetation distributions, and climate change. Students will be using writing to learn the principles of climatology. This course satisfies the WIC requirement for the Geography major.

Course Learning Outcomes:
All students successfully completing GEOG 323 should be able to:
1. Explain physical, chemical, geological, and biological controls on Earth’s climate.
2. Identify the utility and limitations of various climate data sources including proxy records, direct observations, and climate model output.
3. Apply concepts to analyze and quantify complex climate systems.
4. Synthesize the elements of climate by incorporating processes of climate formation, major climate patterns, and the distribution of world climates.
5. Describe relevant aspects of climatic variability and change.
6. Engage in critical thinking in the context of climate change science.
7. Communicate the elements of climate using scientific writing techniques.
Climatology (GEOG 323, 4 credits)
Fall Term 2018: Sept 20th – Dec 7th

Writing-Related Expectations
It is expected that on the first day of class, students will understand and be able to use basic sentence structures, college-level term paper composition, and the elements of grammar. In addition, students will understand and be able to use several types of essay styles including: descriptive, cause/effect, compare/contrast, and critical essay styles.

Writing-Related Learning Outcomes
This course fulfills the Writing Intensive Course (WIC) Baccalaureate Core requirement. It does this by assessing students on the aforementioned learning outcomes using a combination of informal and formal writing assignments, a term research paper, laboratory exercises, and short essay quizzes. Students should demonstrate an acceptable level of writing skills such as basic sentence structure, spelling, and elements of grammar. Students should demonstrate critical thinking skills by composing a scientific essay that uses description, cause and effect, and results of analysis. Students will demonstrate competency in the acquisition, use and referencing of climate data and information, and in the drafting, editing, and revision of essays dealing with laboratory observations related to specific climate concepts.

WIC1. Develop and articulate content knowledge and critical thinking in the discipline through frequent practice of informal and formal writing.

WIC2. Demonstrate knowledge/understanding of audience expectations, genres, and conventions appropriate to communicating in the discipline.

WIC3. Demonstrate the ability to compose a document of at least 2000 words through multiple aspects of writing, including brainstorming, drafting, using sources appropriately, and revising comprehensively after receiving feedback on a draft.

Alignment of Learning Outcomes with Course Assignments

<table>
<thead>
<tr>
<th>WIC LEARNING OUTCOMES</th>
<th>How this outcome will be demonstrated in the course.</th>
<th>How this outcome will be assessed in the course.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop and articulate content knowledge and critical thinking in the discipline</td>
<td>Informal writing: Minute papers, weather vs. climate essay, quizzes, lab exercises, peer reviews.</td>
<td>Informal writing: Quizzes, lab exercises, peer reviews.</td>
</tr>
<tr>
<td>through frequent practice of informal and formal writing.</td>
<td>Formal writing: Weather vs. climate essay, current events essay, research paper sequence, StoryMap project.</td>
<td>Formal writing: Weather vs. climate essay, current events essay, research paper sequence, StoryMap project.</td>
</tr>
<tr>
<td>Demonstrate knowledge/understanding of audience expectations, genres, and conventions</td>
<td>Weather vs. climate essay, research paper sequence, StoryMap project, and peer reviews.</td>
<td>Weather vs. climate essay, research paper sequence, StoryMap project, and peer reviews.</td>
</tr>
<tr>
<td>appropriate to communicating in the discipline.</td>
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</tr>
<tr>
<td>Demonstrate the ability to compose a document of at least 2,000 words through</td>
<td>Research paper sequence, which includes a paper topic proposal, a first and second draft, and a final polished paper</td>
<td>Research paper topic proposal, first and second drafts, and final paper.</td>
</tr>
<tr>
<td>multiple aspects of writing, including brainstorming, drafting, using sources</td>
<td>based on feedback on the drafts from the instructor.</td>
<td></td>
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<tr>
<td>appropriately, and revising comprehensively after receiving feedback on a draft.</td>
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</tbody>
</table>
Explanation of Writing Exercises
The primary objective of this course is to promote the student’s understanding of the scientific basis for global climate patterns and characteristics. Students will be asked for both formal and informal writing samples, including a term research paper.

Informal & Formal Writing Exercises
Students will be asked to write frequently in class with low-stakes assignments that include minute- or write-and-pass papers that discuss course content and peer-reviews of the research paper first draft. Writing style and structure will be formally assessed in short essay questions in weekly quizzes, laboratory exercise critical thinking questions, a weather vs. climate and current events essay, and a term research paper.

Research Paper
This course differs from conventional climatology courses, in that it focuses on writing as a method to learn course content. Many colleges and universities now require students to learn concepts in their own discipline through “writing intensive” (or “writing across the curriculum”) courses. The research paper assigned in this class is designed for a 300-level writing-intensive course in a climatology curriculum. The paper is completed as a 3-step process throughout the term, with critique from the instructor and peer reviews followed by revision after the first and second drafts, leading to an improved and polished final paper at the end of the term.

Each student is asked to research and write about the climate of a region, by understanding and describing the key climate processes associated with the climate classification of their chosen region. Students will incorporate information learned in class via textbook readings and lecture materials, as well as independent research performed via reading peer-reviewed scientific journal articles.

The final paper will approximate 2,000 revised words, totaling 3,000 words for the purpose of the WIC requirements. Final papers will be assessed by content, writing structure and style, and grammar & spelling. More detailed information about the assignment is available in Appendix A of this document.

Scientific Writing Style and Audience
Students will utilize the scientific writing style in all aspects of this course. Students will gain practice and familiarity with this style through assigned readings, lectures, and specific research using scientific journal articles. Formal writing assignments will be assessed for the use of correct conventions. All writing should assume an informed audience, such that basic material from lectures and text is considered “common knowledge”.
### WRITING ASSIGNMENT WORD-COUNT TABLE

<table>
<thead>
<tr>
<th>Assignment title</th>
<th>Graded or ungraded writing?</th>
<th>Number of words</th>
<th>Individual or paired?</th>
<th>Will students revise the assignment?</th>
<th>Total word count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper topic</td>
<td>Graded</td>
<td>250</td>
<td>Individual</td>
<td>No</td>
<td>250</td>
</tr>
<tr>
<td>Paper draft #1</td>
<td>Graded</td>
<td>1,000</td>
<td>Individual</td>
<td>Yes</td>
<td>1,000</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(3-4 pages of main body text)</td>
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<tr>
<td>Paper draft #2</td>
<td>Graded</td>
<td>2,000</td>
<td>Individual</td>
<td>Yes</td>
<td>2,000</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>(6-8 pages of main body text; includes 1,000 words of revised text from draft #1)</td>
</tr>
<tr>
<td>Final paper</td>
<td>Graded</td>
<td>3,000</td>
<td>Individual</td>
<td>No</td>
<td>3,000</td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>(10-12 pages of main body text; includes 2,000 words of revised text from draft #2)</td>
</tr>
<tr>
<td>Formal writing samples</td>
<td>Graded</td>
<td>500</td>
<td>Individual</td>
<td>No</td>
<td>500 × 2 = 1000</td>
</tr>
<tr>
<td>Minute papers / Write-and-pass</td>
<td>Ungraded</td>
<td>50</td>
<td>Individual &amp; Paired</td>
<td>No</td>
<td>50 × 8 = 400</td>
</tr>
<tr>
<td>Peer reviews</td>
<td>Ungraded</td>
<td>100</td>
<td>Paired</td>
<td>No</td>
<td>100 × 2 = 200</td>
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<tr>
<td><strong>TOTAL</strong></td>
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<td><strong>7,850</strong></td>
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<td>(4,850 original + 3,000 revised)</td>
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</tbody>
</table>

1. See p. 3 and Appendix A for descriptions of the writing assignments.
2. The term “ungraded” here encompasses assignments that are minimally graded—that is, ones where students receive credit simply for turning the assignment in; where the writing is evaluated on a check minus, check, or check-plus basis; and so on.
3. One typed double-spaced page of 12 pt. text = approximately 250 words; thus, a 4-page assignment would translate here to 1,000 words.
4. In WIC courses, at least 25% of students’ grades must be based on individual writing. Individually written sections of group papers can count toward this requirement only if the sections are graded individually.
5. To meet the WIC requirement, students must revise a minimum of 2,000 words, with the revision work either spread over several shorter assignments or applied to a single 10-or-more-page assignment.
6. For WIC purposes, the revised assignments count for double the word count of the original assignment; thus, the WIC-counted total word count for a revised 4-page essay would be 2,000 words. For word-count purposes shown in this table, we use the word count tool of Microsoft Word.
## COURSE SCHEDULE (Subject to change, as needed)

<table>
<thead>
<tr>
<th>WEEK</th>
<th>TOPICS</th>
<th>LABS</th>
<th>READING</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Introduction to Climatology</td>
<td>No Lab</td>
<td>None</td>
</tr>
<tr>
<td>1</td>
<td>Atmospheric Structure and Composition</td>
<td>No Lab</td>
<td>Ch. 1-2</td>
</tr>
<tr>
<td></td>
<td>Solar Radiation and the Seasons</td>
<td></td>
<td></td>
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<tr>
<td>2</td>
<td>Energy Balance</td>
<td></td>
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<tr>
<td></td>
<td><em>Weather vs. Climate Essay due Wednesday 10/3 by 3pm</em></td>
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<tr>
<td></td>
<td><em>Quiz #1 on Wednesday 10/3 in class</em></td>
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<td></td>
<td><em>Paper Topic due Friday 10/5 by 3pm</em></td>
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<tr>
<td>3</td>
<td>Energy Balance (cont.)</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Atmospheric Pressure and Wind</td>
<td>Lab 2: Earth-Sun</td>
<td>Ch. 3</td>
</tr>
<tr>
<td></td>
<td><em>Quiz #2 on Wednesday 10/10 in class</em></td>
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<td></td>
<td><em>Class held in the Undergrad Writing Studio on Friday 10/12</em></td>
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<tr>
<td>4</td>
<td>Atmospheric Moisture</td>
<td>Lab 3: The Surface</td>
<td>Ch. 4</td>
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<tr>
<td></td>
<td>Atmospheric Circulation and Pressure</td>
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<tr>
<td></td>
<td><em>Quiz #3 on Wednesday 10/17 in class</em></td>
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<tr>
<td></td>
<td><em>Paper Draft 1 due Friday 10/19 by 3pm</em></td>
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<tr>
<td>5</td>
<td>Major Circulation Modes</td>
<td>Lab 5: Atmospheric</td>
<td>Ch. 5, Ch. 8</td>
</tr>
<tr>
<td></td>
<td>Air Masses and Fronts</td>
<td>Moisture</td>
<td>Journal Article</td>
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<td></td>
<td><em>Peer Reviews due Monday 10/22 by 3pm</em></td>
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<td></td>
<td><em>Quiz #4 on Wednesday 10/24 in class</em></td>
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<tr>
<td>6</td>
<td>Mid-Latitude Cyclones</td>
<td>Lab 8: Atmospheric</td>
<td>Ch. 8-9</td>
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<td></td>
<td>Human Effects on the Atmosphere</td>
<td>Motion</td>
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<td></td>
<td><em>Quiz #5 on Wednesday 10/31 in class</em></td>
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<tr>
<td>7</td>
<td>Climate Classification and Climate Types</td>
<td>Lab 10: Mid-Latitude</td>
<td>Ch. 10, Ch. 14</td>
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<td><em>Quiz #6 on Wednesday 11/7 in class</em></td>
<td>Cyclones</td>
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<td></td>
<td><em>Paper Draft 2 due Friday 11/9 by 3pm</em></td>
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<td>8</td>
<td>No Class Monday 11/12 – Veteran’s Day Holiday</td>
<td>PRISM Exercise</td>
<td>Ch. 15-16</td>
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<tr>
<td></td>
<td>Mountain Climates</td>
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<td></td>
<td>Past Climates</td>
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<td></td>
<td><em>“Quiz #7 on Friday 11/16 in class</em></td>
<td></td>
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<tr>
<td>9</td>
<td>The Science behind Climate Change</td>
<td>Lab 14: Climate</td>
<td>Ch. 15</td>
</tr>
<tr>
<td></td>
<td>Climate Modeling Overview</td>
<td>Controls</td>
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<td></td>
<td><em>Current Events Essay due Wednesday 11/21 by 3pm</em></td>
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<td></td>
<td><em>Thanksgiving Holiday: No lab/class Thurs 11/22 – Friday 11/23</em></td>
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<tr>
<td>10</td>
<td>Climate Change and the Future</td>
<td>No Lab</td>
<td>None</td>
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<tr>
<td></td>
<td><em>Quiz #8 on Wednesday 11/28 in class</em></td>
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<td></td>
<td><em>StoryMap Presentations on Wednesday 11/28 and Friday 11/30 in class</em></td>
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<tr>
<td></td>
<td><em>Paper 3 (final version) due Friday 11/30 by 3pm</em></td>
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</table>
EVALUATION OF STUDENT PERFORMANCE

Evaluation will be through formal and informal writing samples, weekly quizzes, laboratory exercises, and a term research paper. The various evaluation components are weighted according to the following:

- (10%) **Informal writing samples**, via class participation. About 1 per week, or 1% each.
- (10%) **Formal writing samples**, includes the Weather vs. Climate (5%) and Current Events (5%) essays
- (21%) **Seven (7) Laboratory Exercises** – labs are assigned from Exercises for Weather and Climate, a required lab manual book. Optional lab in Week 9 can replace lowest of your 7 lab scores. Worth 3% each.
- (24%) **Eight (8) Weekly Quizzes** – weekly assessment of course content instead of a midterm and final exam. Quizzes will be a mixture of short answer and short essay questions. Lowest quiz score is dropped. Worth 3.5% each.
- (35%) **Term research paper** – Research and write a paper on the climate of an approved, selected region using key concepts learned in class. Includes the following components:
  - 4% topic proposal
  - 8% first draft (6%) + two peer reviews (1% each)
  - 8% second/revised draft
  - 10% polished final paper
  - 5% StoryMap & presentation

Course Grade

General Philosophy:

C  You understand the concepts presented in the course well enough to explain them to me, in conversation and in writing.

B  You understand the concepts well enough to explain them to anyone you might meet at a local café, in conversation and in writing.

A  You can use your understanding of climate processes to explain climate observations, climate and weather patterns, climate change examples and climate change projections for a wide range of climate types; you can clearly synthesize published research, demonstrate critical thinking, and express your own ideas in conversation and in writing.

Grading Scale

Grades are based on the percentage of maximum points accumulated and assigned according to the following scale:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>&gt;92%</td>
</tr>
<tr>
<td>A-</td>
<td>90-92%</td>
</tr>
<tr>
<td>B</td>
<td>87-89%</td>
</tr>
<tr>
<td>B-</td>
<td>83-86%</td>
</tr>
<tr>
<td>C</td>
<td>77-79%</td>
</tr>
<tr>
<td>C-</td>
<td>73-76%</td>
</tr>
<tr>
<td>D</td>
<td>67-69%</td>
</tr>
<tr>
<td>D-</td>
<td>63-66%</td>
</tr>
<tr>
<td>F</td>
<td>&lt;60%</td>
</tr>
</tbody>
</table>
COURSE POLICIES

Attendance
Students are expected to attend all lectures and labs. It is expected that students will arrive on time. A weighting factor based on class attendance will be applied, if necessary, to determine the final grade.

Reading Assignments & In-class writing samples
Reading assignments are required each week. Students must complete these assignments before attending the corresponding lecture. Often times, graded class activities will focus on the reading assignments. In-class activities are low-stakes and cannot be made up under any circumstances.

Formal writing assignments
The essays are to be submitted via TurnItIn in Canvas no later than the start of class on their respective due dates. Late essays are accepted up to 3 days late with a penalty: 10% deduction within the first 24 hours after the due date (this includes the minute class starts!), 25% deduction within 48 hours, and 50% deduction within 72 hours.

Lab Exercises
Lab assignments will be discussed and initiated in lab each week. The completed lab is due no later than 5 PM the following Monday. Completed lab exercises should be turned in to the TA’s mailbox in Wilkinson 104.

Everyone receives ONE no-questions-asked free pass for a late lab assignment with no penalty up to 3 days after the due date. You must indicate your use of this pass to your TA or on your lab. This free pass is valid for LABS ONLY. Additional late labs are accepted up to 3 days late with a penalty: 10% deduction within the first 24 hours after the due date, 25% deduction within 48 hours, and 50% deduction within 72 hours. Assignments will not be accepted after 3 days except in extraordinary circumstances when you have adequately communicated with the instructor. Again, the free pass applies to LABS ONLY.

Quizzes
Quizzes are administered within the first ~15 minutes of class on Wednesdays of Weeks 2-9. Coming in late to class does not grant you extra time on the quiz. Because the lowest quiz score is dropped, quizzes cannot be made up, except in extraordinary circumstances that will be dealt with individually.

Research Papers
All aspects of the research paper should be submitted via TurnItIn in Canvas no later than the start of class on each respective due date. The paper topic and drafts are accepted up to 3 days late with a penalty: 10% deduction within the first 24 hours after the due date (this includes the minute class starts!), 25% deduction within 48 hours, and 50% deduction within 72 hours. Drafts will not be accepted after 3 days except in extraordinary circumstances when you have adequately communicated with the instructor. Due to the time commitment of reading and providing feedback, late paper drafts will not receive detailed revisions. Final papers and StoryMaps are not accepted late, no exceptions.

Incompletes
Incomplete (I) grades will be granted only in emergency cases (usually only for a death in the family, major illness or injury, or birth of your child), and if the student has turned in 80% of the points possible (in other words, usually everything but the final exam). If you are having any difficulty that might prevent you completing the coursework, please don’t wait until the end of the term; let me know right away.
UNIVERSITY POLICIES

Guidelines for a Productive and Effective Classroom

Students are expected to conduct themselves in the course in compliance with the university’s regulations regarding civility (Student Conduct Code).

Civility is an essential ingredient for academic discourse. All communications for this course should be conducted constructively, civilly, and respectfully. Differences in beliefs, opinions, and approaches are to be expected. In all you say and do for this course, be professional. Please bring any communications you believe to be in violation of this class policy to the attention of your instructor.

Active interaction with peers and your instructor is essential to success in this course, paying particular attention to the following:

- Unless indicated otherwise, please complete the text readings for each class before the lecture.
- Be respectful of others and their opinions, valuing diversity in backgrounds, abilities, and experiences.
- Challenging the ideas held by others is an integral aspect of critical thinking and the academic process. Please word your responses carefully, and recognize that others are expected to challenge your ideas. A positive atmosphere of healthy debate is encouraged.

Statement Regarding Students with Disabilities

Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval please contact DAS immediately at 541-737-4098 or at http://ds.oregonstate.edu. DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations.

Accessibility of Course Materials

All materials used in this course are accessible. If you require accommodations please contact Disability Access Services (DAS).

Expectations for Student Conduct

Student conduct is governed by the university’s policies, as explained in the Student Conduct Code.

Academic Integrity

Students are expected to comply with all regulations pertaining to academic honesty. For further information, visit Student Conduct and Community Standards, or contact the office of Student Conduct and Mediation at 541-737-3656.

OAR 576-015-0020 (2) Academic or Scholarly Dishonesty:

a) Academic or Scholarly Dishonesty is defined as an act of deception in which a Student seeks to claim credit for the work or effort of another person, or uses unauthorized materials or fabricated information in any academic work or research, either through the Student’s own efforts or the efforts of another.

b) It includes:
   i) CHEATING - use or attempted use of unauthorized materials, information or study aids, or an act of deceit by which a Student attempts to misrepresent mastery of academic effort or information. This includes but is not limited to unauthorized copying or collaboration on a test or assignment,
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using prohibited materials and texts, any misuse of an electronic device, or using any deceptive means to gain academic credit.

ii) FABRICATION - falsification or invention of any information including but not limited to falsifying research, inventing or exaggerating data, or listing incorrect or fictitious references.

iii) ASSISTING - helping another commit an act of academic dishonesty. This includes but is not limited to paying or bribing someone to acquire a test or assignment, changing someone’s grades or academic records, taking a test/doing an assignment for someone else by any means, including misuse of an electronic device. It is a violation of Oregon state law to create and offer to sell part or all of an educational assignment to another person (ORS 165.114).

iv) TAMPERING - altering or interfering with evaluation instruments or documents.

v) PLAGIARISM - representing the words or ideas of another person or presenting someone else's words, ideas, artistry or data as one's own, or using one's own previously submitted work.

Plagiarism includes but is not limited to copying another person's work (including unpublished material) without appropriate referencing, presenting someone else's opinions and theories as one's own, or working jointly on a project and then submitting it as one's own.

c) Academic Dishonesty cases are handled initially by the academic units, following the process outlined in the University’s Academic Dishonesty Report Form, and will also be referred to SCCS for action under these rules.

OSU Student Evaluation of Teaching

Course evaluation results are extremely important and are used to help me improve this course and the learning experience of future students. Results from the 19 multiple choice questions are tabulated anonymously and go directly to instructors and department heads. Student comments on the open-ended questions are compiled and confidentially forwarded to each instructor, per OSU procedures. The online Student Evaluation of Teaching form will be available toward the end of each term, and you will be sent instructions via ONID by the Office of Academic Programs, Assessment, and Accreditation. You will log in to “Student Online Services” to respond to the online questionnaire. The results on the form are anonymous and are not tabulated until after grades are posted.
Appendix A

SEQUENCED WRITING ASSIGNMENT FOR A CLIMATOLOGY COURSE

Climate observations comprise a wealth of information about atmospheric circulation, weather patterns, and climate trends. A course in climatology can be used to train students to compile and interpret many different aspects of a particular region, and to express their understanding of the region’s climate through writing. This course differs from conventional climatology courses, in that it focuses on writing as a method to learn course content. Many colleges and universities now require students to learn concepts on their own discipline through “writing intensive” (or “writing across the curriculum”) courses. The assignment discussed below is thus designed for a 300-level writing-intensive course in a climatology curriculum. The assignment differs from a normal “term paper” in that it is not done all at once, near the end of the term (that traditional approach often results in disastrous quality and consequences!). Rather, the paper is developed in two steps, with critique from the instructor and revision after the first draft leading to an improved and polished paper at the end of the term.

During the course of the term each student is asked to research and write about the climate of a region, by understanding and describing the key climate processes associated with the climate classification of their chosen region. Students then write about climatological observations at the same pace that each climate process is discussed in lectures. The writing sequence follows the content of the course. Climatological processes thus are given a context; they define the climate of the region studied. Students will incorporate information learned in class via textbook readings and lecture materials, as well as independent research performed via reading peer-reviewed scientific journal articles.

A major problem with the traditional approach to term paper writing is that students are overwhelmed by large volumes of information. A student may write about the climate of Southern California, for example, by incorporating observations by numerous climatologists on disparate aspects of the region’s climate. The student may review so much literature all at once that the paper is a composite of facts and assorted opinions, with poor organization, insight, and comprehension. The instructor might offer comments and suggestions after the paper is turned in; that feedback is in vain, however, if the student is not required to revise. The incorporation of information in steps, accompanied by critique and revision, allows students to remain organized and focused on studying aspects of the climate of their selected region.
Outline of the Paper
The assignment emphasizes concise writing. Students summarize the content of published articles, but in their own style and with their own thoughts included. Each step of the writing process has all the components outlined below; it is important that students visualize their final product, and that they revise each part as the paper evolves during the term.

Potential Paper Topics
By the end of the third week of the course, each student will have selected a climate location. This is the location about which you will write for the rest of the term. The location should be at a “synoptic scale” (for example: the Willamette Valley, USA; the northern Mali (Sahel) region in Africa; the Prince William Sound, Alaska; the Deccan Plateau, India; etc). I strongly recommend doing some preliminary searches to ensure your chosen location has an adequate amount of information available. The LibGuide for this course can be a good starting place: https://guides.library.oregonstate.edu/course-guide/GEO323

Writing Sequence
The sequence below is used for a one quarter course (10 weeks) that emphasizes understanding world climate types through understanding climate processes. The instructor's time for reading and critique is about the same for each iteration because, even though the papers expand in length during the term, they become progressively better written and edited.

The percentage grades for each iteration reflect the overall value of the paper as 35% of the total course grade. A value of 4% for the first draft acknowledges that papers initially may be poorly researched, organized, and written. By the last iteration many papers are of professional quality.

Paper Topic: Due at the start of class Friday of Week 2; 4% of course grade
This includes the title of your paper, a one-page description of your climate location and a list of at least three references. No more than one of these may be a website. Use the Journal of Climate citation style.

First Draft: Due at the start of class Friday of Week 4; 8% of course grade
The paper should be typed, double spaced, and include the following:

- Title/Author
- Abstract
- Main Body: this section includes the bulk of the text, should be ~4 pages long at this stage, and include discussion of the following topics:
  - Physiographic setting of the region
  - Climate elements related to energy
    - Solar radiation, energy balance,
    - latitude, seasonality, day length, insolation
    - energy balance and temperature
  - Climate elements related to moisture
    - humidity and precipitation
    - moisture sources
  - Climate elements related to pressure
    - pressure patterns
    - winds and storms
- Discussion & Conclusion
  - At this stage these sections will be brief
  - Discussion & conclusion are discrete sections, see below for descriptions
- Figures & Tables
  - Map of your region [figure]
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- Climograph for your region [figure]
- Monthly average day length and insolation values [table]
- Full reference list: Use the Journal of Climate citation formatting style.

Second Draft: Due at the start of class on Friday of Week 7; 8% of course grade
Rewrite the entire paper, considering the instructor's feedback and peer reviews from the first draft. Your paper will now include the following:

- Title/Author
- Abstract
- Main Body: this section should be 6-8 pages long at this stage and include the edited sections from the first draft (greyed out below), as well as the following:
  - Physiographic setting of the region
  - Climate elements related to energy
    - Solar radiation, energy balance,
    - latitude, seasonality, day length, insolation
    - energy balance and temperature
  - Climate elements related to moisture
    - humidity and precipitation
    - moisture sources
  - Climate elements related to pressure
    - pressure patterns
    - winds and storms
  - Effects of major circulation modes
    - ENSO, NAM, PDO, MJO, etc. (discuss those relevant to your region)
  - Land-sea effects on climate
    - ocean current effects (where applicable)
    - land-sea interactions (where applicable)
  - Weather patterns and extremes
    - major weather characteristics (cyclones)
    - frontal formation
    - weather hazards
- Discussion & Conclusion
  - At this stage these sections should be well-developed
  - Discussion & conclusion are discrete sections, see below for descriptions
- Figures & Tables
  - Map of your region [figure]
  - Climograph for your region [figure]
  - Monthly average day length and insolation values [table]
  - At least one additional relevant figure that helps describe your region [figure]
- Full reference list: Use the Journal of Climate citation formatting style.

Final, Polished Paper: Due Friday of Week 10; 10% of course grade
Revise previous version based on instructor feedback and add the material on climate type and impacts of climate change. At this stage, the Discussion section should include many of the student's own interpretations and ideas on the climate processes. The Main Body is now 10-12 pages long (excluding title, abstract, references, tables and figures).
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- Title/Author
- Abstract
- Main Body: this section should be 10-12 pages long at this stage and include the edited sections from the first & second drafts (greyed out below), as well as the following:
  - Physiographic setting of the region
  - Climate elements related to energy
    - Solar radiation, energy balance,
    - latitude, seasonality, day length, insolation
    - energy balance and temperature
  - Climate elements related to moisture
    - humidity and precipitation
    - moisture sources
  - Climate elements related to pressure
    - pressure patterns
    - winds and storms
  - Effects of major circulation modes
    - ENSO, NAM, PDO, MJO, etc. (discuss those relevant to your region)
  - Land-sea effects on climate
    - ocean current effects (where applicable)
    - land-sea interactions (where applicable)
  - Weather patterns and extremes
    - major weather characteristics (cyclones)
    - frontal formation
    - weather hazards
  - Climate type
    - Climate classification and formal description
    - Brief comparisons with locations having a similar climate type
  - Climate change
    - evidence for past climate change in the region
    - evidence for recent climate change in the region
    - future projections of climate change in the region
    - potential impacts of climate change

- Discussion & Conclusion
  - At this stage these sections should be complete
  - Discussion & conclusion are discrete sections, see below for descriptions
- Figures & Tables
  - Map of your region [figure]
  - Climograph for your region [figure]
  - Monthly average day length and insolation values [table]
  - At least one additional relevant figure that helps describe your region [figure]

- Full reference list: Use the Journal of Climate citation formatting style.

**StoryMap Presentation: Due Wednesday or Friday of Week 10; 5% of course grade**
You will create an online StoryMap using the ESRI story map tools. The story map will include images of your climate research location, the abstract from your research paper, and other summary text and figures from your research paper. A tutorial, template, and example will be provided for you to follow. Students will present their StoryMaps during the last two days of class.
Components of the Paper
Each component of the paper accomplishes certain tasks. The paper should flow and be easy to follow, i.e., use headings and subheadings to organize sections!

TITLE
The title should be interesting and informative it should tell the reader something about the topic of the paper.

ABSTRACT
- A concise summary of your paper.
- Entices the reader to want to read on; makes the reader curious about the details contained in the rest of your paper.
- The abstract will follow the format used in the Journal of Climate.

MAIN BODY (sections I through IV below are considered the Main Body of the paper):

I. INTRODUCTION
- Introduces physiographic setting of the region to the reader (include a map and a climate graph);
- Describes the significance of the region;
- Defines the objective (thesis statement) of your paper (“the climate of ________, while mainly influenced by ________ and ________, is also strongly controlled by the effects of _________”).

II. CLIMATE PROCESSES AND INTERPRETATIONS
- Describes the important and relevant climate processes that influence the climate of the region
- Summarizes all the climate observations and explains the relevant climate processes through the observations
- Presents interpretations offered in the literature
- Use subheadings to separate information
- Include figures and tables as they become relevant in your writing:
  - You may use scanned copies of figures from books or journal articles
  - You should include the original figure or table caption
  - Table captions go above the table; figure captions go below the figure.
  - In addition to the original caption for the figure/table, type out your own brief caption making the figure relevant to your paper: (e.g. “Fig 1. GOES-East satellite image showing Hurricane Dean as it makes landfall on the Yucatan Peninsula, Mexico”)
  - Write the reference for the figure/table (for example, “Jones et al., 2007”) in the figure caption; include the properly formatted full reference in the reference list at the end of the paper.

III. DISCUSSION
- Presents your own perspectives on how climate processes contribute to understanding the overall climate (including future climate) of the region

IV. CONCLUSIONS
- States what you conclude from your synthesis/analysis
REFERENCES CITED

The writing in your papers must be your own. When you express ideas from literature, you must cite the source of the information or ideas. Contact me if you have questions about how to properly cite and reference sources.

- Paraphrase ideas from a journal article or webpage in your own words and cite the source in the text and in your Reference List at the end of your paper.
- If you find it better to quote a phrase, sentence, or paragraph verbatim, include the material in quotation marks and cite the source immediately after. There is a limit of one quotation per paper.
- Include all papers cited in your paper
- Include only papers cited in your paper
- You MUST use the Journal of Climate format for references (https://www.ametsoc.org/ams/index.cfm/publications/authors/journal-and-bams-authors/journal-and-bams-authors-guide/references)

You may include a maximum of 3 webpages in your References (excluding sources for figures and tables). The rest of your references must be from peer-reviewed scientific journals (see list below) or scholarly books. Journal articles that have been downloaded in electronic format don’t count as webpages (as long as they are from peer-reviewed scientific journals).

RECOMMENDED JOURNALS:

- Journal of Climate
- International Journal of Climatology
- Theoretical and Applied Climatology
- Journal of Geophysical Research
- Bull. of the Amer. Meteorological Soc.
- Global Environmental Change
- Climatic Change
- Water Resources Research
- Journal of Hydrometeorology
- Hydrology and Earth System Science
- Geophysical Research Letters
- Journal of Glaciology
- Quaternary Research
- Nature
- Nature Climate Change
- Nature Geoscience
- Science
- Proc. of the Nat’l Academy of Science
- The Cryosphere
- Ecosphere
- Ecological Applications
- Global Change Biology