Geography 3401: Spring 2016
>> Spring 2017 syllabus will be similar to this one<<
Geography of Environmental Systems and Global Change
9:05-9:55 MWF, 350 Anderson Hall

Course Moodle page: https://ay15.moodle.umn.edu/course/view.php?id=9512

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Office hours: Wednesday 12:45-1:45pm, Friday 10:15-11:30 am, and by appointment

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Office hours by appointment

If you have a registered disability that would benefit from accommodation in this course, please notify Kathy as soon as possible. See Statement on disability accommodation on p. 10 of the syllabus.

➢ Students interested in completing their senior project in conjunction with this course should contact Kathy by 12 February.

This course meets the Environment Theme of the Liberal Education Requirement. What does that mean?

About the Liberal Education Theme requirement:
Regardless of specific theme, Liberal Education Theme courses foster your critical reflection on important, contemporary challenges facing our society and/or the world, challenges that call for your response and participation. These courses especially focus your attention on developing a sense of responsibility for engaging with issues of contemporary relevance, as well as on the realization of the stakes involved. Communities sustain themselves in so far as they meet effectively the challenges that face them. The Liberal Education Theme courses emphasize that critical reflection on, and engagement with, these matters requires that they be understood from different perspectives. Important issues are typically controversial ones. Effective critical reflection requires building a knowledge base regarding critical issues facing society and understanding the process of trial and error involved in deploying that knowledge. A hoped-for result is that a Theme course will enhance your own sense of creative involvement and independent thinking.

Specifically regarding the Environment Theme:
Environmental issues – from global climate change and air, soil, and water quality degradation, to energy security and loss of biological diversity – today are a major preoccupation. Addressing such issues requires you to be at once engaged and informed. Environment Theme courses will inform your understanding of the interrelationships between the non-human environment and human society. This may include attention to the often fluid boundary between nature and society and the ways that each are dynamically changing. Such
courses also introduce you to important underlying scientific principles at stake in selected environmental issues and the possibilities and limitations of various technologies, scientific practices, and public policies aimed at mitigating detrimental environmental impacts. An essential element of becoming informed, however, is your engagement with environmental matters, whether through discussion with each other, writing, case study analysis, or some other relevant vehicle. These courses will prepare you to evaluate a myriad of potential solutions, tradeoffs, and questions of intergenerational equity that surround environmental issues.

How does this course address the Environment Theme?
Geog 3401 – Geography of Environmental Systems and Global Change is a broadly conceived introduction to environmental science and environmental change. Our focus is on understanding the environmental “systems” themselves – the climate, the biosphere, and the land surface – as well as how these systems interact with human decisionmaking to create our total “environment.” We use global climate change as one type of environmental change that has the potential for far-reaching consequences. We begin with a substantial unit on the science of climate: the flows of energy; the important roles of water; principles of atmospheric circulation; and the resulting spatial patterns of climate on which much of human infrastructure (e.g., levees, building codes) and activity (e.g., agriculture, recreation) is predicated. We follow with units on soils/landforms and on ecosystems, including the processes at work that affect the functioning of these systems – nutrient cycles, weathering processes, disturbances (fire, earthquakes, etc.) – and that influence how humans have decided to live on, and use, the land. We spend the last several weeks of the semester looking specifically at questions of future climate change as presented in current reports on the science of climate change, its impacts, and possibilities for adaptation and/or mitigation. The activities and decisions of society in creating and/or altering environmental systems are infused throughout the course, including the values implicit in our activities and decisions.

The capstone project of the course – the term paper – is designed to bring together the science of the environment with the choices of society via a study of the likely impacts of climate change for a particular location. What environmental processes and human activities are important for that specific place? What kinds of climate changes may occur in that location, and how might these changes affect the environment and the people living in that area? What might people in that place “do” about these impacts? We will use international and U.S. assessment documents (see required texts, below) and the results of your own work as the basis for a number of in-class discussions: Do different places have different concerns regarding climate change, and do they have different constraints in the ability of the people living there to mitigate or adapt to those changes? What is the role of individual choice and of social-political “rules” (e.g., availability of flood or crop insurance) in dealing with (or reacting to) environmental change? What are the global consequences of local (or national) environmental decisions (the ethics of international humanitarian relief, creation of “environmental refugees,” etc.)? It is unlikely that there will be consensus among us as to what should be “done” about climate change; our goal is to gain deeper insights into the challenges associated with potential climate change.

What are “Environmental Systems”?
In this course, we use the term “Environmental Systems” to refer to the interacting elements of climate, the biosphere, and the land surface. Climate, the biosphere, and the land surface themselves can also be considered to be comprised of “systems” – for example, the climate “system” includes the atmosphere, oceans, sea ice, snow cover, and so on. A systems framework often is used in the earth and environmental sciences because it puts a focus on the interactions and interrelationships between elements of the environment. Increasingly, human society is considered another fundamental component of environmental systems, and in this course we will specifically consider humans as part of our “environmental system.”
Course objectives

The approach to this course is based on the concept that the physical environment provides the resources that sustain humans, and that our well being depends on our interaction and interdependence with the physical environment.

The objectives for this course are:

- to increase understanding of the physical processes governing environmental systems and how these processes and systems can influence each other;
- to understand how societal decisionmaking and political/economic policies often are predicated on our current understanding of the processes at work within the physical environment;
- to comprehend how changes in the processes governing environmental systems (due either to “natural” or human factors) may influence the evolution of these systems;
- to become better able to critically evaluate scientific questions and claims, especially those concerning the environment;
- to assess how human decisionmaking and societal choices can have environmental consequences at local, regional, and global scales;
- to reflect on the importance of scientific, social, economic, and cultural knowledge in assessing environmental issues; and
- to think about our own roles as agents of environmental change.

We approach these objectives by using global climate change (natural or human-induced) as an example of an environmental change that has the potential to create far-ranging impacts via:

- the potential for propagation of change through the environment, e.g., a change in the climate resulting in a change in vegetation;
- the amplification or suppression of change by feedbacks in the natural environment, e.g., an amplification of temperature increase through a decrease in ice and snow cover;
- the impact of differences in the rate of change of different components of the natural environment, e.g., a rapid change in atmospheric temperature but a slow change in vegetation and soils in response to the temperature change;
- the potential for multiple human impacts to reinforce each other, e.g., both agriculture and industrialization contributing to increased levels of carbon dioxide in the atmosphere;
- the potential for a single human impact to have opposing effects, e.g., the potential opposing effects of carbon dioxide (warming) and sulfur dioxide (cooling), both of which are released in the burning of fossil fuels; and
- the possibility that environmental change is not “bad” for everyone.

The course objectives and approach are directly related to the goals of an Environment Theme course, including (1) investigating an environmental issue of major significance (global climate change); (2) understanding of basic scientific principles underlying the theories of global climate change; (3) understanding of the connected roles of science and society in addressing the causes and potential consequences of environmental change; and (4) fostering an increased awareness of our role as agents of environmental change.
Applicable Student Learning Outcomes

• identify, define, and solve problems
• locate and critically evaluate information
• master a body of knowledge and a mode of inquiry
• communicate effectively
• acquire skills for effective citizenship and lifelong learning

For more information, see the University's statement on Student Learning and Development Outcomes: http://policy.umn.edu/education/undergradlearning.

Required texts
(all are available online; links are provided on the class moodle page)

http://earthonlinemedia.com/ebooks/tpe_3e/

http://www.physicalgeography.net/fundamentals/contents.html

Intergovernmental Panel on Climate Change (IPCC), Fifth Assessment Report (2013-2014) [selections].

U.S. Global Change Research Program, Third National Climate Assessment (NCA) (2014) [selections].
http://nca2014.globalchange.gov/

We also will have a few additional web-based readings. The moodle site will list current reading assignments.

Course Requirements

• **Exams:** There are two essay exams in this course: a midterm and a final. About one week before each exam I will post a set of questions 2 to 3 times longer than the number of questions you will be asked to answer on the exam. At the exam I will select the questions you will answer: three questions for the midterm exam and six questions for the final.

• **Term Paper:** The final (term) paper involves evaluating the local effects of global climate change. Your paper will include: (1) an analysis of the current physical environmental setting for your location (climate, vegetation, topography, and soils); (2) the projected climate changes at your location under increased atmospheric greenhouse gases, as described by the IPCC\(^1\); and (3) the probable changes in physical/biological environments, along with some of the probable consequences for humans, of the predicted climate change. Preliminary parts of your paper will be due at several points during the semester (see class schedule and term paper assignment sheet). Your paper should focus on a location within the

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\(^1\) Intergovernmental Panel on Climate Change
United States (for which information may be more easily available than may be the case for other countries). If you have a compelling reason to study a location outside of the United States, please see me to discuss this option.

- **Short Projects:** You will complete three short projects during the semester. The projects are designed to help you identify resources and begin some of the analyses required for your term paper.

- **Class Participation and Attendance:** I expect that you will attend class and participate in our discussions. At several points in the semester we will have in-class discussions, and attendance will be recorded (but is not mandatory) on those days.

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**Moodle pilot project: Academic Advisor alerts**

The College of Liberal Arts is working on a system, initially piloted during Fall Semester 2015, that can look into Moodle Gradebooks and warn academic advisors when students are performing poorly or are not actively participating in a course. These warnings can be sent early enough that intervention can help students succeed; in contrast, the current system of midterm alerts and end-of-semester grades is often too late to make a difference. Geog 3401 is part of this project for spring 2016 and grade item information from this course is being made available to your academic advisor to assist in outreach efforts to support your success as a student. This grade information will remain confidential to you, your instructor, your advisor, and to technical staff that have a demonstrable “need to know.” Advisors may occasionally use this information to reach out to students who are struggling academically, or who require additional support to be successful in their courses.

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**Workload**

University guidelines state that for undergraduate courses, one credit is defined as equivalent to an average of three hours of learning effort per week (including class time) necessary for an average student to achieve an average grade in the course. For this 4-credit course, then, to achieve “an average grade” you can expect to spend an additional 9 hours per week outside of class time on your coursework. For additional information, see: [http://policy.umn.edu/education/studentwork](http://policy.umn.edu/education/studentwork).

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**Exams and Due Dates**

Students are required to take exams on the announced dates. Class assignments are due at the beginning of class on the scheduled due dates and will be submitted electronically via the class Moodle site (see URL at the top of the first page of the syllabus), unless announced otherwise in class. See the Course Schedule for the list of exam dates and due dates.

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**Late Penalty**

Assignments will incur a 10% points penalty for each 24 hours beyond the due date (excluding weekends and University holidays) – for example, an assignment worth 60 points that was turned in 48 hours late would be penalized 12 points. Assignments are considered late if they are turned in more than 15 minutes after class has started. Late assignments will not be accepted after 10 working days or the day of the final exam, whichever comes first. There will be no exceptions to the late penalty except in cases of legitimate absences (see below).
Make-up Work for Legitimate Absences

Students will not be penalized for absence during the semester due to unavoidable or legitimate circumstances. Such circumstances include verified illness, participation in intercollegiate athletic events, subpoenas, jury duty, military service, bereavement, and religious observances. Such circumstances do not include voting in local, state, or national elections. For additional information, please refer to: http://policy.umn.edu/education/makeupwork.

Incompletes

Incompletes will be awarded only when there is a documented medical emergency, documented family emergency, or documented legal reason for not completing the required course work by the end of the semester. Awarding an incomplete requires a written agreement between instructor and student outlining how and when the work will be completed.

Grading

Your final grade will be computed using the following weighting scheme:

- Midterm Exam: 15%
- Final Exam: 20%
- Final Paper: 35% (total)
- Short Projects: 30% (total)

Course grades will be assigned based on the **weighted percentage** of your scores on lab projects, exams, and your final paper (as listed above). Final grades will be assigned as given in the table below.

<table>
<thead>
<tr>
<th>Weighted course percentage</th>
<th>Course grade</th>
<th>University definition of grade points and achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>93% and above</td>
<td>A</td>
<td>4.000 - Represents achievement that is outstanding relative to the level necessary to meet course requirements</td>
</tr>
<tr>
<td>90-92%</td>
<td>A-</td>
<td>3.667</td>
</tr>
<tr>
<td>87-89%</td>
<td>B+</td>
<td>3.333</td>
</tr>
<tr>
<td>83-86%</td>
<td>B</td>
<td>3.000 - Represents achievement that is significantly above the level necessary to meet course requirements</td>
</tr>
<tr>
<td>80-82%</td>
<td>B-</td>
<td>2.667</td>
</tr>
<tr>
<td>77-79%</td>
<td>C+</td>
<td>2.333</td>
</tr>
<tr>
<td>73-76%</td>
<td>C</td>
<td>2.000 - Represents achievement that meets the course requirements in every respect</td>
</tr>
<tr>
<td>70-72%</td>
<td>C-</td>
<td>1.667</td>
</tr>
<tr>
<td>67-69%</td>
<td>D+</td>
<td>1.333</td>
</tr>
<tr>
<td>60-66%</td>
<td>D</td>
<td>1.000 - Represents achievement that is worthy of credit even though it fails to meet fully the course requirements</td>
</tr>
<tr>
<td>59% and below</td>
<td>F</td>
<td>0.000 - Represents failure and signifies that the work was either (1) completed but at a level of achievement that is not worthy of credit or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an I.</td>
</tr>
<tr>
<td>S</td>
<td></td>
<td>Represents achievement that is satisfactory, which is equivalent to a C- or better.</td>
</tr>
</tbody>
</table>
N

Represents no credit and signifies that the work was either (1) completed but at a level of achievement that is not worthy of credit or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an I.

For additional information, please refer to: http://policy.umn.edu/education/gradingtranscripts.

Extra credit

A maximum of 4 extra credit points can be added to your final course percentage (grade) via documented participation in in-class discussions or activities. Extra credit points will be assigned based on the number of your documented participation days, as a percentage of all possible documented participation days (for example, if there are 8 participation days, and you were there for three of them, you get 1.5 extra credit points).

Procedure for disputing a grade

Any dispute regarding a grade on an assignment or an exam question must be submitted in writing (on paper or via e-mail) no more than two working days after the assignment or exam has been returned. You must provide clear rationale for why you believe that your assignment or exam question deserves a higher score. Statements like “I think I’m right” or “I think I met all of the requirements of this assignment” are not sufficient rationale.

Work retention

The final exam and any unclaimed student work will be retained until the beginning of the same semester in the following academic year (e.g., work completed in a Spring 2016 class will be retained until the start of the Spring 2017 semester). After that time all remaining work will be discarded securely following applicable University document-destruction procedures. For additional information, please refer to: http://policy.umn.edu/education/maintainingrecords.

General course expectations

Here is what you can expect from me and from our TA:

- Plan the course and provide a structured, supportive learning environment.
- Answer questions clearly and follow up on questions when appropriate.
- Provide helpful feedback on exams and assignments.
- Be available during office hours or by appointment to help with questions or concerns regarding this class.
- Respond to e-mail queries within two working days.
- Treat you, as adult learners, with dignity and respect.

See also the University’s policy on Teaching and Learning: Instructor and Unit Responsibilities: http://policy.umn.edu/education/instructorresp.
And here is what I expect from you:

- Attend and actively participate in class: ask questions, listen to answers.
- Take exams on the scheduled dates and submit assignments on time.
- Take responsibility to foster your own learning.
- Honesty and integrity in all aspects of the course.
- Treat me, our TA, and your classmates with dignity and respect.

See also the University’s policy on Teaching and Learning: Student Responsibilities: http://policy.umn.edu/education/studentresp.

Statement on academic conduct

The University seeks an environment that promotes academic achievement and integrity, that is protective of free inquiry, and that serves the educational mission of the University. Similarly, the University seeks a community that is free from violence, threats, and intimidation; that is respectful of the rights, opportunities, and welfare of students, faculty, staff, and guests of the University; and that does not threaten the physical or mental health or safety of members of the University community. To that end, courteous, respectful behavior is expected at all times. Disruption of the academic environment may result in disciplinary action. The University Student Conduct Code defines disruption of the academic environment as “engaging in behavior that substantially or repeatedly interrupts either the instructor's ability to teach and/or a student's ability to learn.”

The academic environment extends to “any setting where a student is engaged in work toward academic credit, satisfaction of program-based requirements, or related activities including but not limited to online courses, learning abroad, and field trips.” Discussions of alternative viewpoints are encouraged in this class and I expect that any such discussions will be constructive and courteous. Questions on class material are always welcome but I ask that extended discussions of such questions be conducted outside of class time.

As a student at the University you are expected to adhere to Board of Regents Policy: Student Conduct Code. To review the Student Conduct Code, please see: http://oscai.umn.edu/know-code/scc-simplified.

Statement on academic integrity

Academic integrity is essential to a positive teaching and learning environment. All students enrolled in University courses are expected to complete coursework responsibilities with fairness and honesty. Failure to do so by seeking unfair advantage over others or misrepresenting someone else’s work as your own can result in disciplinary action. The Student Conduct Code defines scholastic dishonesty as follows:

Scholastic dishonesty means plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering, forging, or misusing a University academic record; or fabricating or falsifying data, research procedures, or data analysis.

Scholastic dishonesty may result in disciplinary action and/or a penalty up to and including an “F” or “N” for the entire course. The Office for Student Conduct and Academic Integrity (http://oscai.umn.edu/) is an excellent resource for questions (and answers) about academic integrity.
Statement on appropriate use of class notes and course materials

My lecture notes are freely available on the course Moodle site. You are welcome to download these notes for your own use, but not for use by others outside of this class. Such actions violate shared norms and standards of the academic community. (See http://policy.umn.edu/education/studentresp, Item 6.) Students may not record any part of a lecture or lab session unless explicitly granted permission by the instructor. (See http://policy.umn.edu/education/studentresp, Item 8.)

Statement on use of personal electronic devices in the classroom

Using personal electronic devices in the classroom setting can hinder instruction and learning, not only for the student using the device but also for other students in the class. To that end, I ask that you please turn off cell phones and other electronics when you come to class, unless those devices are used for the purpose of taking notes, reviewing on-line course material, or responding to instructor-initiated Q and A. Ringing (or vibrating) phones, texting, reading/sending e-mail, checking Facebook, and so on are distracting for me and disruptive for your classmates. If I notice or receive complaints about such behavior, I will remind you of these expectations.

Statement on disability accommodations

The University is committed to providing quality education to all enrolled students. Determining appropriate disability accommodations is a collaborative process. You as a student must register with the Disability Resource Center and provide documentation of your disability. The course instructor must provide information regarding a course’s content, methods, and essential components. The combination of this information will be used by Disability Services to determine appropriate accommodations for a particular student in a particular course. For more information, please consult the Disability Resource Center: https://diversity.umn.edu/disability/.

Statement on mental health services

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol or drug problems, feeling down, difficulty concentrating, and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student’s ability to participate in daily activities. University of Minnesota services are available to assist you with addressing these and other concerns you may be experiencing. You can learn more about the broad range of confidential mental health services available on campus via the Student Mental Health website at http://www.mentalhealth.umn.edu.

Statement on sexual harassment

Students are expected to observe University policies regarding sexual harassment, defined as “unwelcome sexual advances, requests for sexual favors, and/or other verbal or physical conduct of a sexual nature when: (1) submission to such conduct is made either explicitly or implicitly a term or condition of an individual’s employment or academic advancement in any University activity or program; (2) submission to or rejection of such conduct by an individual is used as the basis of employment or academic decisions affecting this individual in any University activity or program; or (3) such conduct has the purpose or effect of interfering with an individual’s work or academic performance or creating an intimidating, hostile, or offensive working or academic environment in any University activity or program.” Violation of this policy may result in disciplinary
action. For additional information, please consult the Board of Regents Policy:

Statement on equity, diversity, equal opportunity, and affirmative action
The University will provide equal access to and opportunity in its programs and facilities, without regard to race, color, creed, religion, national origin, gender, age, marital status, disability, public assistance status, veteran status, sexual orientation, gender identity, or gender expression. For more information, please consult the Board of Regents Policy:

Links to university policies included in the syllabus:
http://policy.umn.edu/education/undergradlearning
http://policy.umn.edu/education/studentwork
http://policy.umn.edu/education/makeupwork
http://policy.umn.edu/education/gradingtranscripts
http://policy.umn.edu/education/maintainingrecords
http://policy.umn.edu/education/instructorresp
http://policy.umn.edu/education/studentresp
http://oscai.umn.edu/know-code/sec-simplified
http://regents.umn.edu/sites/regents.umn.edu/files/policies/SexHarassment.pdf
http://regents.umn.edu/sites/regents.umn.edu/files/policies/Equity_Diversity_EO_AA.pdf

Links to university resources referenced in the syllabus:
http://www.oscai.umn.edu/integrity/student/index.html
https://diversity.umn.edu/disability/
http://www.mentalhealth.umn.edu
<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Reading</th>
<th>Due</th>
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</thead>
<tbody>
<tr>
<td>Jan 20</td>
<td>Introduction to course; climate change overview</td>
<td>Ritter Ch. 3: <em>The Atmosphere</em></td>
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<td></td>
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<td>Pidwirny Ch. 6f-i, Ch. 7a-c</td>
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<tr>
<td>Jan 22</td>
<td>Solar energy and atmospheric composition</td>
<td>Ritter Ch. 4: <em>Energy and Radiation</em></td>
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<td>Pidwirny Ch. 7f-j</td>
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<tr>
<td>Jan 25</td>
<td>Solar energy and atmospheric composition (continued)</td>
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<td>Jan 27</td>
<td>Assigned – Project 1: Climate</td>
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<td>Jan 29</td>
<td>Terrestrial radiation and energy fluxes</td>
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<td>Ritter Ch. 5: <em>Air Temperature</em></td>
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<td></td>
<td>Pidwirny 7k-m, w</td>
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<tr>
<td>Feb 1</td>
<td>Energy fluxes (continued)</td>
<td></td>
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<tr>
<td>Feb 3</td>
<td>Temperature patterns</td>
<td>Ritter Ch. 7: <em>Atmospheric Moisture</em></td>
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<td></td>
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<td>(up through, but not including, the section titled Clouds and Precipitation)</td>
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<td></td>
<td></td>
<td>Pidwirny 8a-d</td>
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<tr>
<td>Feb 5</td>
<td>Water and weather</td>
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<tr>
<td>Feb 8</td>
<td>Water and weather (continued)/ term paper mini-workshop: finding and evaluating sources</td>
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<tr>
<td>Feb 10</td>
<td>Water resources and water budgets</td>
<td>Ritter Ch. 6: <em>Atmospheric and Ocean Circulation</em></td>
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<td></td>
<td></td>
<td>Pidwirny 7n-q, 7z</td>
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<tr>
<td>Feb 12</td>
<td>Water budgets (continued)</td>
<td></td>
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<tr>
<td>Feb 15</td>
<td>Assigned – Project 2: Water budgets</td>
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<tr>
<td>Feb 17</td>
<td>Atmospheric circulation patterns</td>
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</tbody>
</table>

Note: Topic dates may shift a bit over the course of the semester. Due dates are expected to remain as listed on this schedule. All assignments will be submitted via links available on the class Moodle site, unless otherwise announced in class.
<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Reading Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb 19</td>
<td>No class – Kathy at GES Department faculty retreat</td>
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<tr>
<td>Feb 22</td>
<td>Project 2 discussion/workshop</td>
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<tr>
<td>Feb 24</td>
<td>Circulation and precipitation patterns</td>
<td>Ritter Ch. 7: <em>Atmospheric Moisture</em> (beginning at section titled Precipitation Processes) Pidwirny 8e-g</td>
</tr>
<tr>
<td>Feb 26</td>
<td>Climate classification/spatial pattern of climate</td>
<td>Ritter Ch. 9: <em>Climate Systems</em> Pidwirny Ch. 7v</td>
</tr>
<tr>
<td>Feb 29</td>
<td>Spatial pattern of climate (continued)</td>
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<tr>
<td>Mar 2</td>
<td>Term paper workshop: using sources while avoiding plagiarism</td>
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<tr>
<td>Mar 4</td>
<td>Weathering and geomorphic change</td>
<td>Ritter Ch. 17: <em>Weathering, Erosion, and Mass Movement</em> Pidwirny Ch. 10r, x</td>
</tr>
<tr>
<td>Mar 7</td>
<td>Catch-up day/term paper discussion</td>
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<tr>
<td>Mar 9</td>
<td><strong>Midterm exam</strong></td>
<td>Midterm exam</td>
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<tr>
<td>Mar 11</td>
<td>No class – early spring break</td>
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<tr>
<td>Mar 14-18</td>
<td>No class – Spring Break Week</td>
<td></td>
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<tr>
<td>Mar 21</td>
<td>Soil characteristics and formation factors</td>
<td></td>
</tr>
<tr>
<td>Mar 23</td>
<td>Geography of soils</td>
<td>Ritter Ch. 11: <em>Soil Systems</em> Pidwirny Ch. 10t-v</td>
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<tr>
<td>Mar 25</td>
<td>Geography of soils (continued)</td>
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<td>Mar 28</td>
<td>Assigned – Project 3: Soil surveys</td>
<td>Draft of “current environment” section</td>
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<tr>
<td>Mar 30</td>
<td>No class – Kathy at AAG Annual Meeting, San Francisco</td>
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<td>Apr 1</td>
<td>No class – Kathy at AAG Annual Meeting, San Francisco</td>
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<tr>
<td>Apr 4</td>
<td>Rivers and floodplains, oceans and coasts</td>
<td>Ritter Ch. 18: sections on <em>The Geologic Work of Streams</em> and <em>Alluvial Landforms</em> Ritter Ch. 21: section on <em>Coastal Landforms and Processes</em> Pidwirny Ch. 10y-z</td>
</tr>
<tr>
<td>Apr 6</td>
<td>Project 3 discussion/workshop</td>
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<tr>
<td>Date</td>
<td>Topic</td>
<td>Reading/Related Material</td>
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</table>
| Apr 8| Ecosystem processes                                                 | Ritter Ch. 12: *Biogeography of the Earth*  
Ritter Ch. 2: section on *Biogeochemical cycles*  
Pidwirny Ch. 9j-k, p, r-s |
| Apr 11| Ecosystems and biomes                                              | Project 3                                                                                                 |
| Apr 13| Past environments                                                   | Pidwirny 7x-y; additional online readings                                                                 |
| Apr 15| Climate model overview                                             | Selections from IPCC AR5 reports; additional online readings                                              |
| Apr 18| Climate model overview (continued)                                  |                                                                                                           |
| Apr 20| *Term paper workshop: peer evaluation, figures and tables*          | draft of “change” section (upload to moodle AND bring hard copy to class)                                 |
| Apr 22| Future climate change – global                                      | IPCC AR5 *Summaries for Policymakers*                                                                     |
| Apr 25| Future climate change – global (continued)                          |                                                                                                           |
| Apr 27| Future climate change – U.S.                                       | Selections from USGCRP Third NCA                                                                        |
| Apr 29| Future climate change – U.S. (continued)                            | Press release                                                                                             |
| May 2 | Climate change impacts discussion                                   |                                                                                                           |
| May 4 | Press release discussion                                            | Press releases                                                                                             |
| May 6 | Catch-up day/course wrap-up discussion                              | Final paper                                                                                                |

**FINAL EXAM: 1:30-3:30pm, THURSDAY, MAY 12**  
(held in our regular classroom)