

San José State University
Department of Geography and Global Studies
GEOG 1, Geography of the Natural Environment, Sections 80, 81, Spring 2018

Course and Contact Information

Instructor:	Gary Pereira
Office Location:	Washington Square Hall 113
Telephone:	(510) 825-3506
Email:	gary.pereira@sjsu.edu
Office Hours:	By appointment. Call 510-825-3506 any Monday or Wednesday between 3 and 5 PM for issues that cannot be resolved by email. We may set up an appointment if necessary.
Class Days/Time:	online
Classroom:	none
GE/SJSU Studies Category:	Area B1

Course Format

This is an online course. Internet connectivity and a computer are required.

Course materials can be found on Canvas Learning Management System course login website at <http://sjsu.instructure.com>, under **Files**. Assignments are all listed and described under **Assignments**.

Course Description

Atmospheric, biologic and geologic processes that create the natural environments of the world. Discovery of local, regional and global patterns in the location and distribution of environmental phenomena, and the human modifications of natural environments.

Course Goals and Learning Outcomes

This course is approved for General Education Core Physical Science area, B1. Upon successful completion of this course, students will be able to:

1: use the methods of science and knowledge derived from current scientific inquiry in life or physical science to question existing explanations.

Evidence-based learning and discovery form the basis of scientific inquiry. The focus of this class is therefore on evidence, rather than belief. Challenges to existing explanations are approached through examination of evidence.

2: demonstrate ways in which science influences and is influenced by complex societies, including political and moral issues.

The technical and cognitive methods of understanding used by researchers in physical geography are described throughout the course. The goal of achieving relative independence of the natural sciences from social belief systems is recognized, as is the influence of such belief systems on the process of achieving that goal. The influence of the resulting comprehension of natural systems on human societies is emphasized throughout the course, particularly with regard to natural disasters like earthquakes, as well as the complex impact of climate change on social systems.

3: recognize the methods of science, including quantitative, analytical reasoning techniques.

The tools and methodologies of the physical geographical sciences, as well as the analytical and algorithmic reasoning techniques, are studied in some detail. Students shall understand how knowledge is achieved and improved on an ongoing basis. Systems of classification; and physical processes of the natural environment.

Required Texts/Readings

Textbook

The **Fundamentals of Physical Geography** (2nd edition) is a free online textbook with over 300 pages and 400 illustrations, photos and animated graphics. It is the work of two professors from the University of British Columbia Okanagan – Dr. Michael Pidwirny & Scott Jones. Important terms are hyperlinked to a glossary. There are links to study guide pages and additional reading within each chapter. Most importantly for the college student, Internet Weblinks are provided for each chapter that provide a wealth of well-respected sources of additional data and social media. I will only say this here, for those of you who have decided to read the syllabus: showing me in the work you give me (perhaps even only on what interests you the most) that you have followed some of these pathways into knowledge, and eventually understanding, is the most effective way of garnering a perfect or near-perfect grade from me, even if some of your other work wasn't quite perfect. But be sure to provide some kind of citation that would allow the reader to find that source directly. For Internet sources, this requires more than a URL. Just as you would provide with regard to a book or article, I'd like the author(s), title, source or publisher, etc.

Other Readings

climatechangeindicatorsreport2013.pdf
StayingSafeWhereTheEarthShakes_BayArea.pdf
PuttingDownRootsInEarthquakeCountry_BayArea.pdf

These files are all available from Canvas, under Files. Alternative means of downloading them are described in the Course Schedule, below.

Other technology requirements

A computer with internet connection is required for this course. The connection should be capable of handling streaming video.

Course Requirements and Assignments

Please submit your homework responses within Canvas Assignments for this course. Word or pdf files are acceptable. Please keep file sizes reasonable. Use either 10 or 12 point font (or both), with 1 ½ line spacing and normal margins. Please include the following information at the upper right of the first page of each homework submission:

Your name
Geog1-80 or Geog1-81
Spring 2018
Homework #

Figures, images, and quotations from the references listed here or from other sources may be embedded in your homework responses, but you must provide attribution. Citations should be explicit and complete.

Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally 3 hours per unit per week) for preparation/studying or course related activities.

Final Evaluation

In at least four to five pages (10pt font, 1 ½ spaced as usual), you will be asked to describe steps that might be taken before, during, and after a major destructive earthquake, from the perspective of a family member, and/or neighbor, public servant, health care worker, business officer, planner, etc. in order to reduce suffering and loss. Hopefully, this will never happen to you. But living where we do, we all need to take this seriously. That's why I've chosen this topic in place of a comprehensive test. A full description is provided in the Course Schedule below.

Grading Information

Homework: Fourteen homework assignments and the Final Exam must be completed on or before the due dates, as described in the Course Schedule below. Please submit these responses via Canvas. ONLY if Canvas is not working for you for an extended period of time, you may alternatively submit files to my email address <gary.pereira@sjsu.edu> as a Word or pdf attachment. Please use 'geog1' (without quotes) as the subject line of any such emails. You may include any additional comments and questions within the body of the message that you may have for me; otherwise you may leave it empty. If you can submit successfully via Canvas, there is no need to email me.

Determination of Grades

Most homework assignments (6% each) x 13	78%
Homework assignment 11	12%
Final Evaluation	10%
Total	100%

Habitual lateness may result in a full grade change, at the instructor's discretion, following a fair and complete discussion. Occasional lateness is tolerable. If anything remains missing by the end of the semester without discussion or explanation, it counts as a zero grade. I may be late, by your standards, in grading your submissions. Please be patient with me, as I will be with you. Canvas is new for me, and I often make mistakes when I learn new things. We all do. If you have any pressing concerns with regard to this class, please feel free to message me, or email me, or call me during my office hours.

98% and above	A+
94% - 97%	A
93% - 90%	A-
89% - 87%	B+
86% - 84%	B
83% - 80%	B-
79% - 77%	C+
76% - 74%	C
73% - 70%	C-
69% - 67%	D+
66% - 64%	D
63% - 60%	D-
below 60%	F

SJSU classes are designed such that in order to be successful, it is expected that students will spend a minimum of forty-five hours for each unit of credit (normally three hours per unit per week), including preparing for class, participating in course activities, completing assignments, and so on. More details about student workload can be found in University Policy S12-3 at <http://www.sjsu.edu/senate/docs/S12-3.pdf>.

Note that "All students have the right, within a reasonable time, to know their academic scores, to review their grade-dependent work, and to be provided with explanations for the determination of their course grades." See University Policy F13-1 at <http://www.sjsu.edu/senate/docs/F13-1.pdf> for more details.

University Policies

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' [Syllabus Information web page](http://www.sjsu.edu/gup/syllabusinfo/) at <http://www.sjsu.edu/gup/syllabusinfo/>

Geog1-80[81] / Geography of the Natural Environment, Spring 2018

Course Schedule

Week	Due Date	Readings, Assignments
1	2/5/2018	<p>Access the text Fundamentals of Physical Geography at http://www.physicalgeography.net/fundamentals</p> <p>Read CHAPTER 2: Maps, Remote Sensing, and GIS</p> <p>Each chapter of the online text Fundamentals of Physical Geography includes a Study Guide page. At the bottom of each Study Guide page is a list of Essay Questions. For selected chapters, you will be asked to address specific lists of selected questions, and/or additional questions. Responses to questions from the book may be largely copied and pasted from the text. Take your answers, at least in part, from the section of that chapter that discusses the topic at hand. Do NOT take them from the summary of the chapter. In general, about 60-70% of the text in your responses may be derived by judiciously copying from the textbook. Responses to any additional questions that are not from the text should be almost entirely in your own words. Not all questions require a long response, but some do. Use your own judgement, put in the time, and revise our approach in light of your grade and any feedback I might give. Some of the assignments (around the middle of the semester) are lighter than others. That is intentional. Work ahead, if possible. I expect to see homework results that reflect at least a couple of hours a week of focused effort. Hopefully, you will follow some of the Internet Weblinks listed at the end of each chapter and spend hours learning something new and exciting that you hadn't expected. I want to hear about these experiences in some of your homework responses.</p> <p>Submit each homework response via Canvas by the due date if possible, or later. Everything must be accounted for by the end. Penalties for extended lateness are possible.</p> <p>Homework1: Chapter 2 Essay Questions: 1, 7, 8, 9</p> <p>1. What is a map? What two basic forms do they come in? How are projection systems used to portray the Earth's surface on a map? What problems are associated with projecting the Earth's surface on a two-dimensional map?</p> <p>7. What is a topographic map? How does it use maps symbols to represent natural and human constructed features found in the environment? Why are contour lines found on this type of map and how are they used?</p> <p>8. What is remote sensing? What types of remote sensors have been developed to monitor the Earth? Describe some of the guiding principles of object identification that are used for feature recognition.</p> <p>9. What is a GIS? What types of activities are carried out on these computerized systems?</p>

Week	Due Date	Readings, Assignments
2	2/12/2018	<p>We will repeatedly explore topics in climate because they are directly relevant to the central themes of this course. I will ask you to demonstrate a reasonable grasp of what the sciences are in the process of discovering. We will explore more fully the sciences of weather and climate later in this course, but I would like to introduce the topic through the following conversation.</p> <p>Listen: and take notes on the first hour of the following interview with climate scientist Joseph Romm. This is an audio podcast, which you can either download or listen to online. You may of course listen to the whole thing, but I ask you to take notes on only the first hour.</p> <p>https://www.samharris.org/podcast/item/what-you-need-to-know-about-climate-change</p> <p>Homework2: In at least two to three pages (10pt font, 1 ½ spaced), begin by briefly telling me who Joseph Romm is (do a Google search). Then summarize the discussion in the first hour of this interview in such a way as to convince me that you've listened to it carefully. Do not be concerned about expressing or critiquing your own political opinions or those of others. Keep in mind that we are interested primarily with the physical and biological sciences in this course. That is what the first hour is about.</p>
3	2/19/2018	<p>Read CHAPTER 6: Energy and Matter</p> <p>Continue to follow the instructions regarding the textbook assignment for week 1. Try not to be too mechanical in your approach. Feel free to investigate other sources for questions you find particularly interesting.</p> <p>Homework3: Essay Questions 3, 4, 5, 6, 7, 9 , 10, 11, 12</p> <p>3. How do the three mechanisms of conduction, convection and radiation move energy from one place to another?</p> <p>4. Outline the three laws of thermodynamics.</p> <p>5. What is radiation? How is it created? What factors determine its quantity and quality?</p> <p>6. Verbally (i.e., using words rather than equations) define the Stefan-Boltzmann Law. What does it describe?</p> <p>7. Verbally define the Wien's Law. What does it describe?</p> <p>9. How does the Sun create the energy that drives most systems on the Earth?</p> <p>10. How does the tilt of the Earth's axis influence the annual solar insolation received at a site located at 50 degrees North latitude?</p> <p>11. What influence does Earth rotation have on solar insolation received at the equator?</p> <p>12. How does angle of incidence control the intensity of solar radiation received at the Earth's surface?</p>

Week	Due Date	Readings, Assignments
4	2/26/2018	<p>This week provides a short respite from the text and from the linear consideration of topics. The relevant sciences and their pursuit in the Bay Area are wide and diverse, and they provide a wide choice of potential careers. I'd like to get a sense of what might interest you the most.</p> <p>View: Look through the many pages of relatively short videos available from KQED: http://ww2.kqed.org/quest/tag/tag-video/</p> <p>(note the 'next page' button at the bottom of each page).</p> <p>Homework4: Choose any five videos, and write (in paragraph form, using at least ½ page per video), a summary and brief discussion of what you found most interesting about each of them and any questions they bring to mind. Indicate the title of each video as subheadings.</p> <p>Make sure to look through a few pages before making your selections. Don't just stick with the first couple of pages.</p> <p>Your final document should be about three pages long, or more.</p>
5	3/5/2018	<p>Read CHAPTER 7: Introduction to the Atmosphere</p> <p>Homework5: Essay Questions 3, 4, 5, 6, 7, 10, 13, 15, 21</p> <p>3. Why is ozone important for life on Earth? Where is it found and how is it formed? How is human activity influencing this important atmospheric gas?</p> <p>4. How is the incoming shortwave solar radiation from the Sun modified by the atmosphere and the Earth's surface?</p> <p>5. Describe the difference between the following two terms: heat and temperature.</p> <p>6. Describe the shortwave radiation cascade as it relates to the Earth's energy balance.</p> <p>7. Discuss how the Greenhouse Effect works. How has human activity over the last few centuries enhanced this natural process? How will global warming change the environment of the Earth?</p> <p>10. What is a hurricane? Where, when and why does it form? How is global warming likely to influence hurricane intensity and frequency?</p> <p>13. Discuss the formation and characteristics of the various types of thunderstorms.</p> <p>15. What factors are responsible for the altered micro-climate of urban areas?</p> <p>21. Why do urban areas have more energy available for the creation of sensible heat than rural areas?</p>

Week	Due Date	Readings, Assignments
6	3/12/2018	<p>View: Water Vapor Fuels Hurricanes https://ca.pbslearningmedia.org/resource/nves.sci.earth.hurricane/water-vapor-fuels-hurricanes/</p> <p>Homework6:</p> <ol style="list-style-type: none"> 1. What is the primary function of the Aqua satellite? How does it monitor the production of water vapor? 2. Why might molecules of water vapor be described as “little mobile solar collectors”? 3. Describe the role of the Sun in the formation of thunderstorms. <p>View: NOVA: Earth From Space Monitoring Earth's Water Vapor https://ca.pbslearningmedia.org/resource/nves.sci.earth.vapor/monitoring-earths-water-vapor</p> <p>Homework6 continued:</p> <ol style="list-style-type: none"> 4. What is a geostationary orbit? Why do you think it would be useful to have a satellite remain in orbit over one point on Earth? Why do scientists combine data from multiple satellites in geostationary orbit? 5. Explain how topography, latitude, and other factors combine to change the impact of water vapor regionally.
7	3/19/2018	<p>Read CHAPTER 8: Introduction to the Hydrosphere</p> <p>Homework7: Essay Questions 1, 2, 3, 4, 5</p> <ol style="list-style-type: none"> 1. What is streamflow? How can it be expressed in a mathematical model? Describe the effect of an intense 1 hour storm on streamflow over 24 hours using a hydrograph. 2. What factors control the rate of evaporation on a soil surface? 3. Discuss the movement of water into soils. How and why does infiltration vary with time? 4. Why does runoff occur? 5. What forces influence the storage of water in the soil matrix? <p>A1: take a photo (on your phone, for example) of some sort of natural phenomenon that we have covered (or might have covered) so far. Try to take an informative and pleasing shot if possible; you will find that it is not often easy to convey with a camera what you experience as a human being. Embed your photo in this homework response, and provide a short paragraph about it, describing perhaps what your other senses were experiencing or what a wider or narrower view would reveal.</p> <p>I have recently begun filming ‘ambient’ scenes – shots that extend through time, which sometimes helps me to experience or relive a scene better than a series of short shots. Here is some footage of a recent trip up the Yangtze River:</p> <p>https://www.youtube.com/playlist?list=PLBtvag1nixHyhelsCE2H5CysESGyTkqZu</p>

Week	Due Date	Readings, Assignments
8		<p>Spring Recess March 26- 30</p>
9	<p>4/2/2018</p>	<p>Read CHAPTER 8: Introduction to the Hydrosphere</p> <p>Homework8: Essay Questions 7, 10, 12, 16</p> <p>7. Describe the mathematical equation used to model stream discharge.</p> <p>10. What is potential evapotranspiration and how does it differ from actual evapotranspiration? What factors control the rate at which water leaves the Earth's surface by way of evaporation and transpiration?</p> <p>12. Explain how relative humidity is measured.</p> <p>16. Discuss how tides form. What is the difference between a Neap and Spring tide? Explain diurnal, semidiurnal, and mixed tides.</p> <p>A1: Let's try that photo thing again. Take a photo of another natural phenomenon, which we either have or will be covering, specifically or generally. Embed your photo in this homework response, and provide a short paragraph about it, describing perhaps what your other senses were experiencing or what a wider or narrower view would reveal.</p>
10	<p>4/9/2018</p>	<p>Read CHAPTER 9: Introduction to the Biosphere</p> <p>Homework9: Essay Questions 2, 3, 4, 5, 9, 10</p> <p>2. Compare and contrast the function and structure of the grazing and detritus food chain.</p> <p>3. What is an ecosystem? How does it differ from a community? What are some of its important components?</p> <p>4. Evolution describes the process by which species come to possess adaptations. In an essay, describe how evolution works through natural selection, spatial isolation, and gene mutation.</p> <p>5. Explain in detail how energy moves through the grazing food chain and the detritus food chain. Also, discuss how these food chains are related to each other and are necessary for the cycling of nutrients in an ecosystem.</p> <p>9. What are some of the major components of ecosystems? How are these components related to each other?</p> <p>10. Describe how energy flows through ecosystems.</p>

Week	Due Date	Readings, Assignments
11	4/16/2018	<p>Read CHAPTER 9: Introduction to the Biosphere</p> <p>Homework10: Essay Questions 11, 12, 14, 16</p> <p>11. Discuss the term dispersal. Include in your answer an explanation of why organisms want to disperse, and how organisms accomplish this life-cycle strategy.</p> <p>12. Discuss Connell and Slatyer's three mechanisms of succession. Start your answer with a definition and an example of what is succession, and describe how succession begins.</p> <p>14. Compare and contrast the characteristics (climate, plant types, animal life, soil types, etc.) of the following biomes: Tundra, Temperate Deciduous Forest, Desert, and Tropical Rainforest.</p> <p>16. Species vary in abundance both spatially and temporally. Further, we can generalize that a species will occur only where and when: (a). It is capable of reaching a location; (b). Appropriate conditions and resources exist for survival; and (c). Interspecific interactions do not preclude it.</p> <p>View: Plants Affect the Atmosphere</p> <p>https://ca.pbslearningmedia.org/resource/nves.sci.earth.atmosphere/plants-affect-the-atmosphere/</p> <p>Homework10 continued:</p> <p>A1. What primary components of Earth's atmosphere do plants modify through photosynthesis and respiration?</p> <p>A2. How do photosynthesis and respiration relate to one another?</p> <p>A3. How have plants contributed to making Earth a habitable planet?</p> <p>A4. Describe how Earth's atmosphere changes over the course of 24 hours.</p> <p>A5. Why does the Amazon rainforest have such a dramatic impact on the atmosphere?</p> <p>View: NOVA: Earth From Space Lightning Produces Nitrates</p> <p>https://ca.pbslearningmedia.org/resource/nves.sci.earth.nitrate/lightning-produces-nitrates/</p> <p>Homework10 continued:</p> <p>6. On average, how many lightning strikes occur on Earth each second?</p> <p>7. Describe how lightning forms.</p> <p>8. How does lightning produce nitrate?</p> <p>9. Why is nitrate important for living things?</p> <p>10. How does nitrate produced in clouds end up in human bodies?</p>

Week	Due Date	Readings, Assignments
12	4/23/2018	<p>Read: climatechangeindicatorsreport2013.pdf (available from Canvas, under Files).</p> <p>This report is also downloadable directly from California's Office of Environmental Health Hazard Assessment (OEHHA):</p> <p>https://oehha.ca.gov/media/downloads/risk-assessment/document/climatechangeindicatorsreport2013.pdf</p> <p>Additional relevant documents are available here https://oehha.ca.gov/climate-change</p> <p>Homework11: In at least two to three pages (10pt font, 1 ½ spaced), list and describe at least six likely changes in California in the near future due to global climate change, according to this report. Whereas most homework assignments are worth 6 points each, this one is worth 12.</p>
13	4/30/2018	<p>Read: CHAPTER 10: Introduction to the Lithosphere</p> <p>Homework12: Essay Questions 6, 12, 13, 14, 15, 16</p> <p>6. What geologic features are found at the boundaries of tectonic plates? Briefly explain how plate tectonics is responsible for their formation or occurrence.</p> <p>12. Describe the various layers that make up the solid Earth.</p> <p>13. Describe the various physiological features associated with the ocean basins.</p> <p>14. What is a volcano? Where and why do they form? Describe the five different types of volcanoes.</p> <p>15. Describe the various physiological features associated with the Earth's terrestrial surface.</p> <p>16. Describe the various physiological features associated with the Earth's ocean basins.</p>
14	5/7/2018	<p>View: Nutrients from Deep-Sea Vents</p> <p>https://ca.pbslearningmedia.org/resource/nves.sci.earth.hydro/nutrients-from-deep-sea-vents/</p> <p>Homework13:</p> <p>1. What is a hydrothermal vent?</p> <p>2. Describe the process by which hydrothermal vents produce nutrient-rich water.</p> <p>3. What did scientists see in NASA's Aqua satellite data that indicated a phytoplankton bloom?</p> <p>View: NOVA: Extreme Ice Ice-Core Record of Climate</p> <p>https://ca.pbslearningmedia.org/resource/nvei.sci.earth.climate/ice-core-record-of-climate/</p> <p>4. What is an ice core?</p> <p>5. What happened to the level of carbon dioxide in the atmosphere about 125,000 years ago?</p> <p>6. What is the relationship between greenhouse gases in the atmosphere and global temperatures and sea level?</p>

Week	Due Date	Readings, Assignments
15	5/14/2018	<p>Read: CHAPTER 10: Introduction to the Lithosphere</p> <p>Homework14: Essay Questions 17, 20, 21, 25, 28, 32, 33, 34</p> <p>17. Outline the various processes of physical, chemical, or biological weathering.</p> <p>20. Describe the physical characteristics of a location that would favor each of the following types of mass movements: rockfall, rockslide, mudflow, slump, and creep.</p> <p>21. What is a glacier? What conditions are necessary for a glacier to form? Why did continental glaciers form over certain specific regions of the North American continent?</p> <p>25. How do glaciers influence the surface configuration of the Earth by way of erosion and deposition?</p> <p>28. How does beach drift and longshore drift move sediment along coastlines?</p> <p>32. Describe some of the landforms common to environments influenced by eolian processes.</p> <p>33. Describe some the important characteristics of soil.</p> <p>34. What five factors are important in pedogenesis? Explain. Outline how the pedogenic processes operate.</p>
Final Exam	5/22/2018	<p>Read: StayingSafeWhereTheEarthShakes_BayArea.pdf</p> <p>PuttingDownRootsInEarthquakeCountry_BayArea.pdf</p> <p>These documents are available in Canvas, under Files. They are also downloadable from the USGS:</p> <p>StayingSafeWhereTheEarthShakes_BayArea.pdf https://www.earthquakecountry.org/library/StayingSafeWhereTheEarthShakes_BayAreaEdition.pdf</p> <p>PuttingDownRootsInEarthquakeCountry_BayArea.pdf https://pubs.usgs.gov/gip/2005/15/gip-15.pdf</p> <p>Final exam: In at least four to five pages (10pt font, 1 ½ spaced as usual), describe steps that might be taken before, during, and after a major destructive earthquake, from the perspective of a family member, and/or neighbor, public servant, health care worker, business officer, planner, etc. in order to reduce suffering and loss. Hopefully, this will never happen to you. But living where we do, we all need to take this seriously. That’s why I’ve chosen this topic in place of a comprehensive test.</p> <p>Assume that the earthquake has caused casualties, and that people around you may be in need of first aid, at the very least. Assume that you are not trapped, i.e. that you have the ability to move and do things. You may be at work, or school, at home or on the streets. You may fictionalize your account, with specifics, or you may write in the manner of the USGS documents,</p>