# GEOG 206 The Global Environment (Spring 2021)

**Instructor: David Fastovich, dfastovich@middlebury.edu**

Zoom Office Hours: By appointment only from Thursday 10am to 12pm CST.

You can schedule an appointment using this Calendly link or by emailing me directly. If these times don't work with your schedule, don't hesitate to reach out and we can schedule an alternative time.

## Course Description

This course will provide an introduction to the study of the physical environment, with an emphasis on how environmental systems interact. The first half of the course will focus on Earth's climate, specifically, Earth's energy budget, the greenhouse effect, global wind and weather patterns, and global ocean circulation patterns. The second half of the course will focus on patterns and processes of the Earth's surface by examining global patterns of vegetation and the creation of landforms by fluvial, glacial, and aeolian processes. We will use this foundation to understand how our rapidly changing climate will alter each of these systems.

*Important note: the syllabus is the final document for course scheduling and assignment, quiz, and exam dates. If any of these change, I will update the syllabus accordingly and make a note in the change log at the end of the syllabus.*

## Course Format

Lecture:

3 hours of asynchronous lectures each week, posted on Canvas before the start of the week. Length of the lectures will vary from three-60 minute lectures a week to two-90 minute lectures a week.

Laboratory Sections:

GEOG 0206Y - M 5:10pm-6:25pm EST
GEOG 0206Z - W 5:10pm-6:25pm EST

## Course Learning Outcomes

The goal of this course is to provide students with a comprehensive foundation of physical environment. After completing this course students will be able to step outside and understand the mechanisms controlling weather and climate patterns, vegetation patterns, and landforms of the Earth's surface. These foundations are meant to not only provide students' with a background of the physical environment, but serve as a basis for future classes.

**Grading**

40% - Bi-weekly quizzes (5 total - 20 questions each)
30% - Lab Assignments (6 total)
25% - Final Exam (cumulative - 60 questions)
5% - Participation in Lab

I understand that the Fall 2020 and Spring 2021 semesters have been difficult for many students. The pressures of distance learning are an added stress to the already chaotic year caused by Covid-19. If there are any questions, concerns, or thoughts about the class, please do not hesitate to reach out by email or office hours.

**Laboratory Sections**

The laboratory portion of this course will be used to introduce the scientific process as it applies to the Earth sciences. Each Lab Assignment must be submitted 2 weeks after it has been assigned (refer to the syllabus/Canvas for up-to-date deadlines).

Science is a collaborative effort and I strongly encourage you all to work together and use each other as resources to complete these assignments. Every other laboratory section will be used to facilitate this collaborative effort. For example, Lab Assignment 1 will be assigned on Week 2 but is due on Week 4, so the Week 3 lab section will be used to check in about the course and work on the lab assignment together.

**Recommended Materials**

*Physical Geography: The Global Environment 5th Edition- Joseph Mason, Jason Burt, Peter Muller, Harm de Blij*

If you need additional instruction beyond office hours, lab sections, and the Discussion page on Canvas, I strongly recommend this textbook. This textbook can be rented for as little as $30 online (I would recommend using slugbooks.com to find the most affordable prices). The Fourth Edition of the textbook can be rented/purchased for as little as $10. I recommend using the Fifth Edition, because that's the textbook I have read and the reading listed below corresponds to the Fifth Edition. However, the Fourth Edition should also be acceptable. The largest differences between the two editions are Chapter/Unit numbers and the coverage of Biogeochemical cycles. If you purchase/rent the Fourth Edition you will likely have to do some extra work to make sure you're reading the sections that correspond to the Fifth Edition.

**Course Schedule**

| Week | Lecture Topics | Laboratory Sections | Reading |
|---|---|---|---|
| 1<br>*(2/24 - 2/26)* | **Introduction to Course Pt. 1**<br><br>*Lecture 1 - Physical Geography and Earth System Science*<br>*Lecture 2 - The Physical Earth Environment* | NONE | Mason pgs. 2-10 (Unit 1), 15-25 (Unit 2), 28-38 (Unit 3) |
| 2<br>*(3/1 - 3/5)* | **The Climate System**<br>Earth's Energy Budget<br><br>*Lecture 3 - Electromagnetic Radiation and the Sun*<br>*Lecture 4 - Heat Transport on the Earth*<br>*Lecture 5 - Earth's Energy Budget, Seasonality, and Global Temperature Patterns* | Lab 1 - Earth Energy Budget and Wind Patterns | Mason pgs. 45-54 (Unit 4), 56-65 (Unit 5) |
| 3<br>*(3/8 - 3/12)* | The Atmosphere and Winds<br><br>*Lecture 6 - Structure and Components of the Atmosphere*<br>*Lecture 7 - Pressure Gradient Force*<br>*Lecture 8 - Global Circulation Patterns*<br><br>**QUIZ 1 - 3/12** | Lab 1 cont. | Mason pgs. 69-83 (Unit 6), 98-107 (Unit 8), 109-120 (Unit 9) |
| 4<br>*(3/15 - 3/19)* | Tropical and Midlatitude Weather Patterns Pt. 1<br><br>*Lecture 9 - Atmospheric Stability*<br>*Lecture 10 - Tropical Weather Patterns*<br>*Lecture 11 - Midlatitudinal Weather Patterns* | Lab 1 DUE<br>Lab 2 - Stability and Cyclones | Mason pgs. 86-95 (Unit 7), 135-136 (Unit 11), 151-161 (Unit 12), 165-177 (Unit 13) |
| 5<br>*(3/22 - 3/26)* | Tropical and Midlatitude Weather Patterns Pt. 2<br>*Lecture 12 - Water Budgets and Global Climate Patterns*<br><br>The Oceans Pt. 1<br>*Lecture 13 - Structure of the Ocean*<br>*Lecture 14 - Atmosphere-Ocean Interactions (Ekman transport)*<br><br>**QUIZ 2 - 3/26** | Lab 2 cont. | Mason pgs. 136-148 (Unit 11), 122-133 (Unit 10), 461-469 (Unit 38) |
| 6 | The Oceans Pt. 2 | Lab 2 DUE | N/A |

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| *(3/29 - 4/2)* | *Lecture 15 - Ocean Circulation Patterns Pt. 1 (Surface Circulation)*<br>*Lecture 16 - Ocean Circulation Patterns Pt. 2 (Deep Ocean Circulation)*<br>*Lecture 17 - Atmosphere-Ocean Variability* | Lab 3 - Ocean Circulation and our Future Climate | |
| 7<br>*(4/5 - 4/9)* | Science of Climate Change Pt. 1<br><br>*Lecture 18 - What is Climate Change? (Paleoclimate Perspective)*<br>*Lecture 19 - What is Climate Change? (Modern Perspective)* | Lab 3 cont. | Mason pgs. 230-241 (Unit 18), 243-257(Unit 19) |
| 8<br>*(4/12 - 4/16)* | Science of Climate Change Pt. 2<br><br>*Lecture 20 - Detection and Attribution*<br>*Lecture 21 - Mitigation and Adaptation of Future Climate Change*<br><br>**The Biosphere**<br>Global Distribution of Plants and Earth's Biomes Pt. 1<br><br>*Lecture 22 - Climate Classification and Biomes of the World*<br><br>**QUIZ 3 - 4/12** | Lab 3 DUE<br>Lab 4 - Biogeochemical Cycles and Soils | Mason pgs. 243-257(Unit 19), 263-265 (Unit 20), 181-214 (Units 14-16), 319-329 (Unit 25) |
| 9<br>*(4/19 - 4/23)* | Global Distribution of Plants and Earth's Biomes Pt. 2<br><br>*Lecture 23 - The Community Concept PART 1*<br>*Lecture 24 - The Community Concept PART 2*<br><br>Biogeochemical Cycles Pt. 1<br><br>*Lecture 25 - The Nitrogen Cycle*<br><br>**QUIZ 4 - 4/23** | Lab 4 cont. | Mason pgs. 265-269 (Unit 20) |
| 10<br>*(4/26 - 4/30)* | Biogeochemical Cycles Pt. 2<br><br>*Lecture 26 - The Carbon Cycle PART 1*<br>*Lecture 27 - The Carbon Cycle PART 2*<br><br>Soils Pt. 1<br><br>*Lecture 28 - Formation of Soils PART 1* | Lab 4 DUE<br>Lab 5 - Fluvial, Aeolian, and Glacial Landforms | Mason pgs. 272-279 (Unit 21), 347-354 (Unit 27), 356-365 (Unit 28), 368-375 (Unit 29) |
| 11 | Introduction to the Physical Earth Pt. 2 | Lab 5 cont. | Mason pgs. |

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| *(5/3 - 5/7)* | Soils Pt. 2<br><br>*Lecture 29 - Formation of Soils PART 2*<br>*Lecture 30 - Soil Orders and Global Soil Patterns*<br><br>**QUIZ 5 - 5/7** | | 398-408 (Unit 32), 411-420 (Unit 33), 422-429 (Unit 34) |
| 12<br>*(5/10 - 5/14)* | **Surface Processes**<br>Introduction to the Physical Earth Pt. 1<br><br>*Lecture 31 - Composition of the Earth*<br>*Lecture 32 - Volcanism and Earthquakes* | Lab 5 DUE<br>Lab 6 - Key Questions in Physical Geography (EXTRA CREDIT) | Mason pgs. 433-459 (Units 35-37) |
| 13<br>*(5/17 - 5/21)* | The Changing Surface Pt. 2<br><br>*Lecture 33 - Diastrophism*<br>*Lecture 34 - Erosion of the Earth*<br><br>**CUMULATIVE FINAL - TBD** | Lab 6 DUE | Mason pgs. 521-553 (Units 43-45), 563-571 (Unit 47) |

**Syllabus Changes**

2.17.2020 - Posted on Canvas
2.20.2020 - Moved Quiz 3 to 4/12 from 4/9
3.3.2020 - Change title of Lecture 21
4.19.2020 - Update list of lectures to account for Lecture 23 taking two lecture slots
5.7.2020 - Updated schedule to account for several two part lectures; made lab 6 extra credit