

# Geology 102: Global Environmental Science – The Science of Climate Change

~~ Syllabus ~~

Spring, 2014  
University at Buffalo

## Instructors:

Dr. Jason Briner Office: 410 Hochstetter Phone: 645-4326 Email : jbriner@buffalo.edu Office Hours: T 3:30-4:30, by appointment	Dr. Shawn Malone Office: 710 North Sciences Complex (NSC) Phone: 645-4262 Email: shawnmal@buffalo.edu Office Hours: M 11-12; W 3-4; TH 11-12
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**Note:** Susan Bratcher is the instructor for the 102 labs – if you have questions about your labs, contact your lab TA or Susan Bratcher – bratcher@buffalo.edu

**Course Hours:** Tuesday, Thursday 2:00 - 3:20

**Course Location:** Cooke Hall room 121

**Course Website :** UBLearns – ublearns.buffalo.edu

**Required Text :** Earth – Portrait of a Planet (Marshak)

**Clickers:** Clickers are a required part of this course.

## Course Descriptions:

This course provides an introductory level overview of the science of climate change. In order to better understand climate change on our planet, we learn how the individual components (land, water, air, life forms) are interconnected. Earth system science is the study of how different aspects of the Earth system: geosphere, hydrosphere, atmosphere and biosphere are related and continuously interact with each other to produce a complex whole. This course introduces the Earth system, dominantly through the perspective of the geological sciences. The GLY101/102 sequence fulfills the university's general education natural science requirement, and provides a gateway into any earth science related discipline.

## Specific Objectives:

- To continue the theme of 'Earth System Science' established in GLY 101, now moving on to cover the increasingly important topic of climate change, and the roles that all earth systems (e.g., oceans, atmosphere, etc.) take part in the Earth's climate system.
- Specifically, the course will demonstrate the relationship between the geosphere, through fundamental geological processes (e.g. formation of the Earth, sea floor spreading, weathering, and volcanic eruptions), with the other components of the Earth's system.

- To introduce the science behind several major natural hazards (including hurricanes, other severe weather, sea level rise, river flooding).
- To discuss the controls and relative contributions of both natural and anthropogenic contributions to climate change, the most important issue facing our planet today.

<u>TOPIC</u>	<u>LEARNING OUTCOMES</u>	<u>OUTCOME ASSESSMENT</u>
Atmosphere	Understand the structure and composition of our atmosphere, its general circulation patterns, extreme events and natural hazards relating to atmosphere, greenhouse gasses, ozone hole.	HW, Quiz, Exam 1
Hydrologic cycle, rivers and flooding	Understand basics of Earth's hydrologic cycle, river systems, processes and landforms. Flooding, landforms, risks, mitigation	HW, Quiz, Exam 2
Natural hazards and oceanography	Understand several common natural hazards to society relating to volcanism, climate change, sea level rise, landslides and ocean circulation shutdown. Understand ocean circulation patterns and general oceanography	HW, Quiz, Exam 2
Global warming, glaciers and sea level rise	Develop deeper understanding of science behind global warming and climate change, understand the role that ice sheets, sea ice, and glaciers play in global climate change, and how each is affected by climate change.	HW, Quiz, Exam 3

**Course Structure:** This is a lecture course that includes outside reading and regular homework questions.

***Course Requirements and Expectations. You are expected to:***

- Attend all classes, and to bring your clicker each day.
- Do the assigned reading or homework *before* coming to class; late homework will not be accepted without prior arrangement.
- Check the class website (UBLeans) prior to coming to each class.
- Respect your classmates by keeping quiet during lecture, and to ***not use your cell phone or the internet during class.***

***Clickers***

We will use the student response system known as “clickers” in this class. You are required to have a TurningPoint ResponseCard XR clicker.

**Grading Structure:**

- |                                       |     |
|---------------------------------------|-----|
| 1. Three Exams (20% each)             | 60% |
| 2. Homework Assignments               | 20% |
| 3. In class participation and quizzes | 20% |

A	A-	B+	B	B-	C+	C	C-	D+	D	F
>92	92-90	89.9-88	87.9-83	81.9-80	79.9-78	77.9-72	71.9-70	69.9-68	67.9-60	<60

(You will receive a separate grade for the lab associated with this class)

**Exams:** There will be three exams in this class. The third exam is not a final, just a non-cumulative midterm. Exams will be roughly 2/3 multiple choice and true/false. Roughly 1/3 of each exam will be short answer questions or diagram-based questions.

**Homework:** There will be 6 homework projects assigned during the semester. If you complete all 6 homeworks, the lowest grade will be dropped. All homework must be turned in on their respective due dates for you to receive full credit. We will accept late assignments with the following grade reductions.

- Assignments handed in up to 2 weeks late: 20% off of per each week late, starting immediately after due time. No assignments will be accepted if turned in more than 2 weeks late.

**Quizzes:** There will be six graded quizzes on lecture content in some classes; these cannot be made up. Most quizzes will be announced ahead of time; some may not. If you complete all 6 quizzes, the lowest grade will be dropped.

**Participation:** In class participation will be clicker-based. I will use your clicker responses for non-graded participation points.

***Academic Integrity:***

Cheating is a disservice to yourself and your peers. UB's policy on Academic Integrity states: "Academic integrity is a fundamental university value. Through the honest completion of academic work, students sustain the integrity of the university while facilitating the university's imperative for the transmission of knowledge and culture based upon the generation of new and innovative ideas." If I discover that you are cheating in this course, I will follow the procedures outlined here:

<http://undergrad-catalog.buffalo.edu/policies/course/integrity.shtml>.

***Special Needs:***

If you have a disability and may require some type of instructional and/or examination accommodation, please inform me early in the semester so that we can coordinate the accommodations you may need. If you have not already done so, please contact the Accessibility Resources office. The office is located at 25 Capen Hall and the telephone number is (716) 645-2608.

***GLY102 Laboratory:***

Your lab is a completely separate course from the lecture, and we have no control over grading the labs—that rests in the hands of your Teaching Assistant. Grades you receive in lecture in no way influence the grades you receive in lab, and vice-versa.

**GLY 102 Spring 2014: Tuesday, Thursdays 2:00-3:20**

<b>Tuesday</b>	<b>Thursday</b>	<b>Text Reading</b>	<b>HW</b>
<b>28 Jan.</b>	<b>30 Jan.</b>		
Introduction, syllabus and course overview [dr. B]	Climate Change Overview [dr. B]	793 - 817	
<b>4 Feb.</b>	<b>6 Feb.</b>		
Atmosphere Structure and circulation [dr. M]	Greenhouse Gasses [dr. M]	679 – 693; 794, 800	<del>#1 Feb 6</del>
<b>11 Feb.</b>	<b>13 Feb</b>		
Hurricanes [dr. M]	Volcanoes and climate [dr. B]	693 – 710; 256 – 257, 280-281	#1 due Feb 13 <del>#2 Feb 13</del>
<b>18 Feb.</b>	<b>20 Feb.</b>		
Ozone Hole [dr. B]	Air Pollution [dr. M]	807 – 808; 494 – 495	#2 due Feb 20
<b>25 Feb.</b>	<b>27 Feb.</b>		
<b>EXAM I</b>	Hydrologic Cycle [dr. M]	526 - 537	<del>#3 Feb 27</del>
<b>4 Mar.</b>	<b>6 Mar.</b>		
Rivers [dr. M]	Flooding Hazards [dr. M]	569 – 592, 594 – 595; 593, 596 - 602	#3 due Mar 6
<b>11 Mar.</b>	<b>13 Mar.</b>		
Landslide Hazards [dr. M]	Volcanic Hazards [dr. M]	540 – 567; 272-280	<del>#4 Mar 11</del>
<b>18 Mar.</b>	<b>20 Mar.</b>		
Spring Recess	Spring Recess		
<b>25 Mar.</b>	<b>27 Mar.</b>		
Oceans & Ocean Circulation [dr. M]	Ocean Circulation Shutdown [dr. M]	608 – 645	#4 Mar due 27
<b>1 Apr.</b>	<b>3 Apr.</b>		
Ocean-Atmospheric Interactions – ENSO [dr. M]	Global warming and Oceans [dr. M]	712 - 713	
<b>8 Apr.</b>	<b>10 Apr.</b>		
<b>EXAM II</b>	Climate Change – IPCC [dr. B]	IPCC report	<del>#5 April 10</del>
<b>15 Apr.</b>	<b>17 Apr.</b>		
Paleoclimate [dr. B]	Glaciers Today [dr. B]	771 – 783, 795-819	#5 due April 17
<b>22 Apr.</b>	<b>24 Apr.</b>		
Ice Sheet Change [dr. B]	ice sheet case study [dr. B]	815; TBA	<del>#6 April 24</del>
<b>29 Apr.</b>	<b>1 May</b>		
Sea Level Change [dr. B]	Sea level rise and New York City [dr. B]	TBA	#6 due May 1
<b>6 May</b>	<b>8 May</b>		
TBA [dr. B]	Class synthesis [dr. B]	TBA	
<b>Exam III, Final Exam Week</b>	<b>Tuesday May 13, 3:30-6:30</b>	<b>Cooke 121</b>	