

**Morehead State University**  
Department of Earth & Space Sciences

**ESS 340 – Oceans & Atmosphere**  
**Fall 2014**

**Instructor:** Dr. Eric Jerde

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**Office Hours:** M-F 2 – 4 pm

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**Text:** The Oceans and Climate, 2<sup>nd</sup> Edition: Bigg, Cambridge

**Grading Criteria:** Your final grade will be based on:

10 Problems / Case Studies	160 points
Reading Quizzes	70 points
Case Study Quizzes	100 points
Final Exam (comprehensive)	<u>70 points</u>
<b>TOTAL</b>	<b>400</b>

**Grades:** Grading is based on total points for the course.

A >350 points; B = 300-349; C = 250-299; D = 200-249; E <200

• **Attendance:** Attendance will not be taken specifically. However, the reading quizzes and quizzes on the Problems / Case Studies cannot be made up. No single one is very large (only 10 points), so if you miss one, it is not a disaster. When it comes to weather, or if we're having class, we will follow the University schedule. If MSU is open, class will take place.

• **Problem Sets / Case Studies:** The course will not be a lecture / regurgitate format. It will involve "active learning", where you will have the opportunity to work during the 2 hours of each class period on problems that demonstrate a current question in the study of the ocean – atmosphere system. This may involve my showing you things on the internet, demonstrating methods of calculation, or answering questions. It will be up to you to learn the material through use and understanding rather than memorization. They will be due on specific dates, and will not be accepted after that. Concepts build, and you will need to keep up, or it will become more difficult to work against the tide.

**Objectives:** Once the course is finished, you should be able to:

*Foundational:*

- 1) Describe the physical interactions between the ocean and atmosphere.
- 2) Describe the chemical interactions between the ocean and atmosphere.
- 3) Articulate the details of climate variability and change.

*Application:*

- 4) Use data in the form of tables and graphs to interpret the ocean & atmosphere system.
- 5) Solve quantitative problems associated with the ocean & atmosphere.
- 6) Assess the impact of various inputs to the climate system.

*Integration:*

- 7) Identify the inter-relationships between the ocean & atmosphere, and relate them to the geosphere (rocks).

*Human Dimension:*

- 8) Describe in broad terms the human place within the earth system

*Learning how to Learn:*

- 9) Be able to frame useful questions about the climate, and develop a framework for their solution.

**Special Needs:** In compliance with the ADA, all students with a documented disability are entitled to reasonable accommodations and services to support their academic success and safety. Though a request for services may be made at any time, services are best applied when they are requested at or before the start of the semester. To receive accommodations and services the student should immediately contact the Disability Services Coordinator in the Office of Academic and Career Services, 223 Allie Young Hall, 606-783-5188, [www.moreheadstate.edu/acs/](http://www.moreheadstate.edu/acs/)

**Campus Safety Statement:** Emergency response information will be discussed in class. Students should familiarize themselves with the nearest exit routes in the event evacuation becomes necessary. You should notify your instructor at the beginning of the semester if you have special needs or will require assistance during an emergency evacuation. Students should familiarize themselves with emergency response protocols at <http://www.moreheadstate.edu/emergency>

# SYLLABUS

Date	Topic	Chapter
August 18	Intro – Prob. 1 – Ocean Reservoirs (15p)	<b>1</b>
20	Definitions; Excel; Problem applications	
25	Reading Quiz 1 (10p); Turn in Prob. 1; review; Prob. Quiz 1 (10p)	<b>2</b>
27	Prob. 2 – Ocean Current Energy (15p)	
September 1	<b><i>Labor Day – No Class!!</i></b>	
3	Reading Quiz 2 (10p); Work on Prob. 2	
8	Turn in Prob. 2; review; Prob. 2 Quiz (10p)	
10	Prob. 3 – CO <sub>2</sub> sequestration in Oceans (15p)	<b>3</b>
15	Equilibrium Constants; Work on Prob. 3	
17	Reading Quiz 3 (10p); Turn in Prob. 3; review; Prob. 3 Quiz (10p)	
22	Prob. 4 – Oxygen Cycle (10p); Assessing Variables	<b>4</b>
24	Work on Prob. 4	
29	Prob. 5 – Cycle Drivability (20p); Assessing Variables	
October 1	Turn in Prob. 4; review; Prob. 4 Quiz (10p)	
6	Reading Quiz 4 (10p); Work on Prob. 5	
8	Turn in Prob. 5; review; Prob. 5 Quiz (10p)	
13	Prob. 6 – El Nino (10p); Atmospheric Patterns	
15	Work on Prob. 6	<b>5</b>
20	Prob. 7 – El Nino Prediction (20p); Turn in Prob 6; Review; Prob. 6 Quiz (10p)	
22	Reading Quiz 5 (10p); Work on Prob. 7	
27	Turn in Prob. 7; review; Prob. 7 Quiz (10p)	
29	Prob. 8 – Past Climates ( <i>may work in pairs</i> - 20p); data proxies	
November 3	Work on Prob. 8; Tectonic Effects on Climate	<b>6</b>
5	Reading Quiz 6 (10p); Work on Prob. 8 Presentations	
10	<b><i>No Class – Talks during the day</i></b>	
12	Turn in Prob. 8; Prob. 8 Presentations (15p)	
17	Prob. 9 – Human Climate Forcing (15p)	<b>7</b>
19	Work on Prob. 9	
24	Prob. 10 – 21 <sup>st</sup> Century Predictions – Carbon Cycle (20p) Turn in Prob. 9; review; Prob. 9 Quiz (10p)	
26-28	<b><i>Thanksgiving Break – No Class!!</i></b>	
December 3	Reading Quiz 7(10p); Work on Prob. 10;	
5	Turn in Prob. 10; review; Prob. 10 Quiz (10p); <b>Receive Final</b>	

**FINAL EXAM – Take-Home (70pts)**

**DUE Thurs., Dec 11, 2014, 10:15 am**