

UNIVERSITY OF DELAWARE  
DEPARTMENT OF GEOGRAPHY

*Bioclimatology*, Geog 342  
D. Levia

Spring Semester 2009

**Class period and venue:** TR 12:30-13:45 pm; Memorial Hall, Rm. 048

**Office hours:** TR 14:00-15:30 or by appointment; Pearson Hall, Room 210

**Textbook:** Bonan, G. (2008) *Ecological Climatology: Concepts and Applications* (Cambridge University Press) Articles should be downloaded from the internet via our library homepage. Articles not accessible via the internet will be supplied in advance.

---

**Course prospectus:** Ecological climatology is a broad, diverse, and interdisciplinary sub-discipline of climatology, integrating, among others, physics, chemistry, biology, ecology, physiography, and plant physiology. This course intends to provide students with a rigorous introduction to ecological climatology through the primary literature and student engagement via active learning approaches. To this end, students will be required to attend each and every class session and give weekly presentations on assigned readings. The course will culminate with a problem-based (PBL) learning activity which seeks to develop a strategy for a uniquely African Green Revolution in the context of ecological climatology and the human environment AND a final paper critiquing three journal articles within the purview of ecological climatology. Upon successful completion of the course students will be able to: (1) explain the scope of ecological climatology and its nuances to an average layperson; (2) articulate a process-based understanding of biosphere-atmosphere exchange of energy and matter utilizing a systems approach; (3) explain some of the underlying equations that govern the exchange of energy and matter among earth's spheres; and (4) apply a base knowledge of ecological climatology and the human environment to chart a plausible trajectory for an African Green Revolution.

---

**Course evaluation:**

Midterm exam	20%
PBL activity	30%
Critique paper	30%
Student participation	20%

**NO MAKE-UP EXAMS OR EXTRA CREDIT WILL BE PERMITTED. LATE ASSIGNMENTS NOT ACCEPTED. UNIVERSITY POLICIES REGARDING ACADEMIC HONESTY, AS EXPLICITLY STATED BY THE OFFICE OF JUDICIAL AFFAIRS, WILL BE IN FORCE.**

---

**Course schedule:**

Feb 10, T

Lecture: Course introduction

Reading: Bonan (2008), Ch.1, pp. 1-11; Tout (1987)

Feb 12, R                      Discussion: Earth systems science: approach and advantages  
Reading: Bonan (2008), Ch. 2, pp. 15-27; Asner et al. (2004)

---

Feb 17, T                      Discussion: Energy fluxes and snowmelt, I  
Reading: Bonan (2008), Ch. 3, pp. 28-37; Petzold (1981)

Feb 19, R                      Discussion: Energy fluxes and snowmelt, II  
Reading: Leonard and Eschner (1968); Lundberg (1993)

---

Feb 24, T                      Discussion: Biometeorology of forested ecosystems, I  
Reading: Bonan (2008), Ch. 11, pp. 153-169; Levia and Frost (2003)

Feb 26, R                      Discussion: Biometeorology of forested ecosystems, II  
Reading: Pfister & Schneebeli (1999); Abrahams et al. (2003)

---

Mar 3, T                        Discussion: Biometeorology and elemental cycling  
Reading: Cappellato and Peters (1995); Johnson et al. (2001)

Mar 5, R                        Discussion: Ice storms: climatology and effects on the biosphere  
Reading: Irland (2000); Houlton et al. (2003)

---

Mar 10, T                      Discussion: Leaf area index  
Reading: Bonan (2008), Ch.18, pp. 253-257; Marshall and Waring (1986); Roberts (2000)

Mar 12, R                      Discussion: Leaf energy fluxes  
Reading: Bonan (2008), Ch. 16, 229-236; David et al. (2004); Kumagai et al. (2008)

---

Mar 17, T                      Discussion: Leaf phenology: effects on distribution of solar radiation  
Reading: Bonan (2008), Ch. 26, pp. 418-431; Hutchison and Matt (1977); Parker and Tibbs (2004)

Mar 19, R                      Discussion: Global change and terrestrial ecosystems  
Reading: Bonan (2008); Hansen et al. (2001); Iverson and Prasad (2002)

---

Mar 24, T                      **MIDTERM EXAM**

Mar 26, R	<u>Discussion</u> : Return and review of midterm exam
Mar 31 and Apr 2	SPRING BREAK
Apr 7, T	<u>Discussion</u> : Hurricanes and forest ecosystems <u>Reading</u> : Bonan (2008), Ch. 22, pp. 326-346; Scatena et al. (1996); Cooper-Ellis et al. (1999)
Apr 9, R	<u>Discussion</u> : Wildlife response to weather and climate change <u>Reading</u> : Callcott et al. (2000); Green et al. (1999); Korzukhin et al. (2001)
Apr 14, T	<u>Discussion</u> : Land degradation, drylands, and agriculture <u>Reading</u> : Blaikie (1985); McCabe (1990); Balling et al. (1998)
Apr 16, R	<u>PBL activity</u> : African Green Revolution ( <b>due 7 May 2009</b> ) <u>Task</u> : Dissemination & explanation of assignment; group designation
Apr 21, T	<u>PBL activity</u> : African Green Revolution <u>Task</u> : Brainstorming
Apr 23, R	<u>PBL activity</u> : African Green Revolution <u>Task</u> : Making connections
Apr 28, T	<u>PBL activity</u> : African Green Revolution <u>Task</u> : Making connections
Apr 30, R	<u>PBL activity</u> : African Green Revolution <u>Task</u> : Construct final concept map
May 5, T	<u>PBL activity</u> : African Green Revolution <u>Task</u> : Construct final concept map
May 7, R	PREPARE FOR FINAL PAPER PRESENTATIONS
May 12, T	PREPARE FOR FINAL PAPER PRESENTATIONS
May 14, R	PREPARE FOR FINAL PAPER PRESENTATIONS

---

May 19, T

Discussion: Final paper presentations

---

May 26, T

**DEADLINE FOR SUBMISSION OF FINAL MANUSCRIPT  
(9:30AM)**

---