

SYLLABUS--GEOGRAPHY 411 (U/G, 3 credits)
PHYSICAL CLIMATOLOGY
Fall 2006

Lecture: M 3:30 p.m.-6:10 p.m. (BOL 435)
Instructor: Prof. Mark D. Schwartz, Ph.D. Email: mds@uwm.edu
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Office Hours: by appointment only

Course Objectives

This course is designed to help students gain an appreciation for and basic understanding of the complex nature of climatic processes at the microclimate scale. Budgets of energy, water, and momentum, and soil-plant-atmosphere interactions at the earth's surface will all be explored from both a theoretical and practical point of view.

**Main textbook: Rosenberg, Microclimate: The Biological Environment,
2nd Ed. (1983)**

The main textbook as well as supplementary handouts are available on reserve in the main library. More information is available at:

<http://www.uwm.edu/Course/416-411/>

COURSE POLICIES

1. Evaluation (undergraduates and graduates will be evaluated separately)

UNDERGRADUATES: Grades will be assigned on the basis of the total points accumulated from tests, exercises, and discussion/participation throughout the semester (370 possible). These will consist of 3 equally weighted exams (100 points each), exercises (total of 50 points), and discussion/participation, including attendance (total of 20 points).

GRADUATE STUDENTS: In addition to the above requirements, graduate students will prepare a 10 page (2500 word minimum) report on a microclimate-related topic with approval of the instructor, which will be worth 50 points. Therefore they will be graded based on 420 points.

The percentages necessary to receive certain grades will be no higher than the following:

88%--(A-) 78%--(B-)
68%--(C-) 58%--(D-)

2. Notices: Grades, once given, are final except in cases of clerical error. Do not use a red pencil or pen to write exam answers. All tests must be taken as scheduled; make-ups are given in case of documented student illness or other emergency only. It is the responsibility of the student to notify the instructor when an exam or other course requirement will be missed. If you need special accommodations in order to meet any of the requirements of this course, please contact me as soon as possible. Do your own work...plagiarism and cheating are unacceptable and will not be tolerated. Additional information regarding the policies and procedures that apply to this course are at: <http://www.uwm.edu/Dept/SecU/SyllabusLinks.pdf>, and posted in the Geography Dept. main office, BOL410. See also the Uniform Syllabus Policy at: <http://www.uwm.edu/Dept/SecU/facdocs/1895A.pdf>.

Suggested additional texts available in the main library:

- Campbell, G. S.: An Introduction to Environmental Biophysics
Chang, Jen-hu: Climate and Agriculture-An Ecological Survey
Duffle & Beckman: Solar Engineering of Thermal Processes
Garratt, J.R.: The Atmospheric Boundary Layer
Gates, D.M.: Energy Exchange in the Biosphere
Geiger, R.: The Climate Near the Ground
Lowry, W.: Weather and Life, An Intro. to Biometeorology
Oke, T.R.: Boundary Layer Climates
Munn, R.E.: Descriptive Micrometeorology
Sellers, W.D.: Physical Climatology
Strahler, A.H.: The Earth Sciences
Sutton, O.G.: Micrometeorology

TENTATIVE SCHEDULE and Readings

**Textbook Chapters (Rosenberg-R)
and Course Handouts (H)**

Sept.	11-M-Course introduction and procedures Energy balance-microclimate measurement	R-Intro., H1 R1, H2
	18-M-Blackbody Radiation Theory Solar Radiation (Exercise 1 distributed, 5 points)	H3
	25-M-Terrestrial radiation Radiation energy balance and net rad. (Exercise 1 due, Exercise 2 distributed, 5 points)	
Oct.	2-M-Soil heat flux, conduction <i>**Graduate Student paper topic approval due**</i> Soil properties and influences (Exercise 2 due, Exercise 3 distributed, 10 points)	R2, H4
	9-M-Soil properties and influences EXAM ONE	
	16-M-Soil properties and influences Temperatures and lapse rates	R3, H5
	23-M-Sensible heat transfer (Exercise 3 due, Exercise 4 distributed, 10 points) <i>**Graduate Student paper outline due**</i> Sensible heat transfer	
	30-M-Field measurement excursion one (weather permitting) Field measurement excursion two (weather permitting)	
Nov.	6-M-Atmospheric Stability, Wind and effects (Exercise 4 due, Exercise 5 distributed, 10 points) Wind breaks, local influences	R4, H6 H7
	13-M-Moisture properties EXAM TWO	R5, H8
	20-M-Evapotranspiration (Exercise 5 due) Soil-Plant-Atmosphere interactions (Exercise 6 distributed, 10 points)	R7, H9
	27-M-Soil-Plant-Atmosphere interactions (continued) Photosynthesis, Respiration (Extra Credit Exercise Distributed)	R8
Dec.	4-M-Soil modification, Urban climates (Exercise 6 due) Windbreaks and shelters	R6 R9
	11-M-Frost control, Water use efficiency Biometeorology (Extra Credit Exercise Due) Course Review and Evaluation– GRAD. PAPERS DUE!	R10,R11 R12
	20-Wednesday-EXAM THREE, 3:00 p.m. - 5:00 p.m.	