

ECOSYSTEM ECOLOGY (ENVS 604)
FALL 2011
TR 5:30-8:30 PM -- 4 CREDITS

COURSE SYLLABUS

Instructor: Dr. Brian D. Fath

Office: 273 Smith Hall

Office Hours: TR 10:45-12:15 or by appointment

Office Phone: 410-704-2535

Email: bfath@towson.edu

Text: White, I.D., Mottershead, D.N., and Harrison, S.J. 1992. *Environmental Systems*, 2nd Edition. Stanley Thornes, Ltd., London. (PDF files available from instructor)

Recitation: Collected papers

Modeling Primer: Richmond, B. 2001. *An Introduction to Systems Thinking*. High Performance Systems, Hanover, NH. (on reserve at library)

Additional reading assignments will be drawn from other material.

Course Description: ENVS 604 examines the principles of ecosystem ecology using energy flow and mass transfer as unifying themes; the discussion is set in a thermodynamic perspective. Specific topics include: history of the ecosystem concept, factors controlling ecosystem structure and function, energy balance, biogeochemical cycles, impacts of human alterations, and urbanized ecosystems.

Learning Outcomes:

1. Learn a systems approach to interpreting field natural history and ecological processes and relationships (textbook)
2. Learn how to identify flora, fauna, and abiotic properties of ecosystems (field labs)
3. Learn elementary *system theory, modeling, simulation* and ecological *systems analysis* employing the computer software STELLA (computer labs).
4. Learn the history and major concepts of ecosystem ecology (recitation).

Format: The four outcomes are addressed using four different formats:

1. Instructor-led lectures from textbook and other material (with plenty of student discussion),
2. Field labs and weekend field trips (see below),
3. Computer labs and group modeling project; and,
4. Student-led recitations (discussions) on classic papers in ecosystem ecology.

Fieldtrip: Saturday field trip to the Appalachians (Catoctin Park and Cunningham Falls, October 2) and possibly to Chesapeake Bay (October 30).

Evaluation:

Midterm Exam	25%
Final Exam	25%
Report #1 Envirogram	15%
Report #2 Group modeling project	15%
Recitation lead	10%
Recitation participation	5%
Homework/Quiz/other	5%

Report #1 Individual Project *Envriogram simulation & dynamic sensitivity analysis*

1. Prepare a life-cycle envirogram for a selected plant, animal, or microbial species commonly found in Oregon Ridge Park (exceptions ok if approved by instructor)
(e.g., see uts.cc.utexas.edu/~gilbert/research/fireants/faenviron/concept.html)

Report #2 Team Project *Ecosystem Simulation, and Dynamic and Static Systems Analysis*

1. Construct a STELLA compartment model of the Oregon Ridge ecosystem chosen by your group.
2. Conduct dynamic simulations and sensitivity analyses of this model.
3. Conduct a static analysis of the model's path, flow, and storage relationships.
4. Group oral presentation of project last day of class.

Grading Scale (based on percent of overall points): A = 92-100; A- = 90-91; B+ = 88-89; B = 82-87; B- = 80-81; C+ = 78-79; C = 70-77; D = 60-69; F = 0-59

Grading Policy: Course grade will be based on the combined total points from exam, reports, recitation, homework, and class participation. Format of exam is multiple choice, short answer, or other formats explained to you. Exam will be comprehensive, covering all class activities, discussions, lectures, and readings. Assignments missed for justified and documented reasons may be made up. The student is responsible for obtaining permission and making arrangements for any make-up assignment before the next class session meets.

Attendance: This is an interactive class, with emphasis on group projects. Therefore attendance is required, and unexcused absences will detract from your grade. If emergencies or scheduling difficulties arise, then you must contact the instructor as soon as possible to arrange to make up work.

Conduct: Towson University policies on proper code of conduct apply to this course including academic honesty (see Towson University Student Policy Book). Failure to comply will result in a failing grade for that assignment. Repeat offenders will receive a failing grade for the course.

Health Alert: Students should not attend classes or other university events from the onset of flu-like symptoms until at least 24 hours after the fever subsides without the use of fever reducing medications. Such absences will be considered excused absences; however, students are responsible for the material covered during the period of their absence.

Tentative Course Schedule:

Week	Date	Topic/Activities	Reading
1	1-Sept	Introduction to Ecosystem Ecology/ What is environment?	pp. 1-2; 1
2	6-Sept 8- Sept	Systems and Change Catchment Basin/ Ecosystem	p. 487; 23, 27 10, 18
3	13- Sept 15- Sept	Energy Relations, Intro to networks Organisms as Complex Adaptive Systems, Envirogram, Biomes	3
4	20- Sept 22- Sept	LAB 1 Field Reconnaissance LAB 1 Field Reconnaissance	In the field
5	27- Sept 29- Sept	LAB 2 Terrestrial sampling LAB 3 Aquatic sampling	In the field, HW#1 due In the field, HW#2 due
6	4-Oct 6-Oct 8-Oct	Ecosphere Recitation 1/Weathering, Slope Field trip to Mountains	7, HW #3 due 11, 12
7	11- Oct 13- Oct	Aeolian, Coastal, Fluvial/ Modelling Overview Recitation 2/ Ecological Dynamics	13, 15, 16
8	18- Oct 20- Oct	MIDTERM EXAM Recitation 3/ Intro to modelling	
9	25- Oct 27- Oct	Primary Production/ Grazing-Predation Recitation 4/Intro to STELLA	19, 20 R1, R2
10	1- Nov 3- Nov 5-Nov	Detrital, Soil/ Computer Lab Recitation 5/ Computer Lab Field trip to Chesapeake Bay	21, 22
11	8- Nov 10- Nov	Change in Physical Systems, Change in Living Systems Recitation 6/ Computer Lab	24, 25
12	15- Nov 17- Nov	Human Modification Recitation 7/ Computer Lab	26, Envirogram DUE
13	22- Nov 24- Nov	Ecosystems as Complex Adaptive Systems, Sustainability Thanksgiving Break	NO CLASS
14	29- Nov 1- Dec	Recitation 8/ Computer Lab Urban Systems	
15	6- Dec 8- Dec	Recitation 9/ Computer Lab Ecosystem Services (MEA) / Review	
16	13- Dec 15- Dec	FINAL EXAM GROUP PRESENTATIONS	

Key to Reading: Bold refers to chapter # (or pages where marked) in White et al. textbook and R# to chapter in Richmond.