

## APPLICATION FOR NEW COURSE

1. Submitted by the College of Arts and Sciences Date: January 23, 2008

Department/Division proposing course: Geography

2. Proposed designation and Bulletin description of this course:

a. Prefix and Number GEO 531

b. Title\* LANDSCAPE ECOLOGY

\*If title is longer than 24 characters, write a sensible title (24 characters or less) for use on transcripts:

LANDSCAPE ECOLOGY

c. Courses must be described by at least one of the categories below. Include the number of actual contact hours per week for each category, as applicable.

() CLINICAL () COLLOQUIUM () DISCUSSION () LABORATORY () LECTURE  
 () INDEPEND. STUDY () PRACTICUM () RECITATION () RESEARCH () RESIDENCY  
 () SEMINAR () STUDIO () OTHER – Please explain: \_\_\_\_\_

d. Please choose a grading system:  Letter (A, B, C, etc.)  Pass/Fail

e. Number of credit hours: 3

f. Is this course repeatable? YES  NO  If YES, maximum number of credit hours: \_\_\_\_\_

g. Course description:

This course explores the field of landscape ecology– the causes, development, importance of ecological processes, and the interactions of dynamic processes over broad spatial scales that can serve as foundation for decision-making and problem solving.

h. Prerequisite(s), if any:

Six hours of physical geography or biology.

i. Will this course be offered through Distance Learning? YES  NO

If YES, please circle one of the methods below that reflects how the majority of the course content will be delivered:

Internet/Web-based      Interactive video      Extended campus      Kentucky Educational Television (KET/teleweb)      Other

Please describe "Other": \_\_\_\_\_

3. Teaching method:  N/A or  Community-Based Experience  Service Learning Component  Both

4. To be cross-listed as: \_\_\_\_\_  
 Prefix and Number      Signature of chair of cross-listing department

## APPLICATION FOR NEW COURSE

<sup>†</sup>In order to change the program(s), a program change form(s) must also be submitted.

17.  The major teaching objectives of the proposed course, syllabus and/or reference list to be used are attached.
18.  Check box if course is 400G or 500. If the course is 400G- or 500-level, you must include a syllabus showing differentiation for undergraduate and graduate students by (i) requiring additional assignments by the graduate students; and/or (ii) the establishment of different grading criteria in the course for graduate students. (See SR 3.1.4)

19. Within the department, who should be contacted for further information about the proposed new course?

Name: Matthew Zook, DUS Phone: 7-8334 Email: zook@uky.edu

20. Signatures to report approvals:

1/22/2008	Karl Raitz	[Signature]
DATE of Approval by Department Faculty	printed name	Reported by Department Chair signature
3/25/08	Leonides Pachos	[Signature]
DATE of Approval by College Faculty	printed name	Reported by College Dean signature
5/6/08	S. Gill	[Signature]
* DATE of Approval by Undergraduate Council	printed name	Reported by Undergraduate Council Chair signature
/	/	/
* DATE of Approval by Graduate Council	printed name	Reported by Graduate Council Chair signature
/	/	/
* DATE of Approval by Health Care Colleges Council (HCCC)	printed name	Reported by Health Care Colleges Council Chair signature
/	Reported by Office of the Senate Council	
* DATE of Approval by Senate Council	Reported by Office of the Senate Council	
/	Reported by Office of the Senate Council	
* DATE of Approval by University Senate	Reported by Office of the Senate Council	

\*If applicable, as provided by the *University Senate Rules*. (<http://www.uky.edu/USC/New/RulesandRegulationsMain.htm>)

## GEOG 531: LANDSCAPE ECOLOGY

**Instructor:** Dr. Rosemary Sherriff

**Office:** POT 1571 **Phone:** 257-6057 **Email:** rsherriff@uky.edu

**Office hours:** to be assigned

**Prerequisites:** Six hours of physical geography or biology. Some familiarity with geographic information systems (GIS) and statistics desirable but not required.

**Definition of Landscape Ecology:** This course will explore the field of landscape ecology, which is an emerging interdisciplinary field that emphasizes the importance of geographical context for understanding many natural and human systems. Landscape ecology emphasizes spatial patterning – the causes, development, importance of ecological processes, and the spatial interactions of dynamic processes. The concepts of landscape ecology often focus on ecological dynamics over broad spatial scales and serve as foundation for decision-making and problem solving in applied fields such as conservation sciences, land-use management, and urban planning and development.

**Course Learning Objectives:** The learning objectives of the course are as follows:

- Understand the principles of landscape ecology as a framework for landscape research, analysis and management;
- Become familiar with concepts, methods and applications of landscape ecology; and
- Show understanding of (1) the detection and characterization of landscape patterns, (2) how these patterns develop, (3) landscape dynamics, (4) the implications of landscape patterns, and (5) application of landscape management.

**Course Structure:** The course topics are scheduled as week blocks. The course structure includes lecture, discussion, computer and field exercises, and student presentations.

<b>Evaluation:</b>	Exam I	25%
	Exam II	25%
	Annotated Bibliography and Presentation	20%
	Readings and Discussion	10%
	Computer and field exercises	10%
	Participation	10%

The requirements for graduate and undergraduate students will differ in the following ways:

- Exams: Approximately 50 percent of each exam will be the same for graduate and undergraduates but there will be separate essay questions for each to test graduates' deeper understanding.
- Annotated Bibliography: Undergraduates will work in groups while graduate students will do the assignment individually.
- Annotated Bibliography: Undergraduates will review 4 articles and graduate students will review 15 articles.

**Grading Scale:** A = 90-100%    B = 80-89%    C = 70-79%    D = 60-69%    E < 60%

Note: Graduate students scoring less than 70 percent will be awarded an E.

**Required Text:** M.G. Turner, R.H. Gardner and R.V. O'Neill. 2001. *Landscape Ecology in Theory and Practice*. Springer-Verlag, New York.

**Weekly Readings:** Weekly readings will include selected chapters from the text and supplemental articles from the primary literature.

**Supplemental Requirement:** A calculator.

**Exams (50% grade):** There will be two exams that involve synthesizing topics from the assigned readings, lecture and discussions. I will provide example questions and topics that may be asked on the exam prior to each exam as a study guide. No make-up exams. Approximately 50 percent of each exam will be the same for graduate and undergraduates but there will be separate essay questions for each to test graduates' deeper understanding.

**Annotated Bibliography and Presentation (20% grade):**

In this assignment you will work both individually and in groups. During the week prior to spring break, I will ask you to identify a particular topic that we have discussed or a related topic to explore in more detail. After I identify broad topics of interest by students, I will assign each undergraduate into a broad topic group while graduate students will do the assignment individually. Each topic group will then identify interests among the group (or graduate student) to focus on for review and discussion with the entire class during one day of the last two weeks of class. Each group will choose a couple of articles for the class to read as part of the discussion on the chosen topic (presentation and discussion 10% grade).

For example, a number of students may be interested in exploring the topic of natural disturbance as a landscape process in more detail. As a topic group interested in disturbance, these students may decide to review the role of wildfire on ecosystems in the Southeastern US or methods used to reconstruct fire history. As a group you will put together a presentation that includes time for discussion of the topic with the entire class. You should talk to me individually about your ideas as soon as possible. I can also provide examples of possible topics.

Individually, each of you will review articles (4 for undergraduates; 15 for graduate students) on the broad topic chosen by the group, but included as part of this will be the articles chosen by the group to review with the class. For each article provide the reference citation, describe the purpose of the study, the data used, the analysis, and discuss the strengths and weaknesses of the study. The bibliography is due on the day when the final exam is scheduled. The bibliography should be typed and double-spaced (10% grade).

**Readings and Discussion (10% grade):** Prior to each week, one or more students will post questions to the entire class on Blackboard about the assigned reading to be used as discussion points as we cover the weekly material. In addition, these students will turn in a 2-page summary and critique synthesizing the concepts, theory, methods and importance of the assigned reading as it relates to the weekly topic. For this assignment, you should raise questions and issues to be discussed, evaluate the contribution of the readings to the fields of landscape ecology and physical geography, and facilitate discussion among the class. Each student will post questions and write a summary twice during the semester (each representing 5% of the final grade).

**Computer and Field Exercises (10% grade):** There will be three computer exercises and one fieldtrip that will allow you to explore applications of the concepts discussed in class. There will generally be two parts to each exercise: (1) an in class explanation and exploration of the

concepts, and (2) a computer or field component in which we meet in a location to be announced. In addition, you will be expected to spend time out of class on the exercise and turn in a brief report for each exercise.

**Class Participation (10% grade):**

Regular attendance and participation in class is very important and part of your class grade. All students are expected to have read the assigned readings before class and to be prepared to discuss the weekly readings. Discussion will be key to understanding the weekly readings.

**Other Information:**

Late assignments: If an assignment is due, please notify me in advance that you need an extension due to a personal hardship, illness or other reason. Late assignments will not be accepted otherwise unless it is an emergency situation with documentation.

Classroom environment: All cell phones, pagers, etc. **MUST** be turned off while in class. If it is an emergency and you are expecting a phone call, please set it to vibrate and take the call outside of the classroom. Please be respectful of yourself and others in the classroom.

Academic integrity: Cheating and plagiarism are unacceptable and subject to discipline as prescribed by the University (see <http://www.uky.edu/Ombud/Plagiarism.pdf> for an explanation of plagiarism and UK policies).

Students with special needs: Any student with a documented disability who would like to request accommodations should contact the Disability Resource Center as early in the semester as possible. The Center is located in Alumni Gym - Room 2, phone: 257-8701, website: <http://www.uky.edu/StudentAffairs/DisabilityResourceCenter/>. Students with physical, learning or temporary disabilities should have the Center contact me. Feel free to discuss your concerns with me directly as well, but I have to have a documented letter from the Center for accommodations.

**Course Schedule:**

---

<b>Week</b>	<b>Dates</b>	<b>Topic</b>
1		Introduction and landscape principles
2		Scale
3		Introduction to models
4		Simulating changes in landscape pattern / <i>Exercise 1</i>
5		Causes of landscape patterns
6		Quantifying landscape patterns
7		Quantifying landscape patterns / <b>Exam I</b>
8		Understanding landscape metrics / <i>Exercise 2</i> (bring a calculator!)
9		Agents of pattern - physical environment & biotic processes
10		Agents of pattern - disturbance regimes
11		Landscape disturbance / <i>Exercise 3</i>
12		Guest speaker and fieldwork preparation / <i>Fieldtrip (Saturday)</i>
13		Community responses and biodiversity
14		Conservation, land use and nature reserve design / <b>Exam II</b>
15		Presentations and discussion

16		Presentations and discussion
17	<b>Date XX</b>	<b>Bibliography due</b>

---

## **Weekly Reading List: [supplemental readings may be changed]**

Chapter readings from the textbook of Turner et al. 2001 are specified as TGO.

### **Week 1:**

TGO Ch 1

### **Week 2:**

TGO Ch 2

Delcourt, H.R., and P.A. Delcourt, and T. Webb. 1983. Dynamic plant ecology: the spectrum of vegetation change in space and time. *Quat. Sci. Rev.* 1:153-175.

### **Week 3:**

TGO Ch 3

Baker, W.L. 1989. A review of models of landscape change. *Landscape Ecol.* 2:111-133.

### **Week 4:**

Exercise 1

Gustafson, E.J. 2002. Simulating changes in landscape pattern. In S.E. Gergel and M.G. Turner, eds. *Learning Ecology: A Practical Guide to Concepts and Techniques*, pp. 49-61. Springer-Verlag, New York.

### **Week 5:**

TGO Ch 4

Delcourt, H.R., and P.A. Delcourt. 1988. Quaternary landscape ecology: relevant scales in space and time. *Landscape Ecol.* 2:23-44.

Knapp, A.K., J.M. Blair, J.M. Briggs, S.L. Collins, D.C. Hartnett, L.C. Johnson, and E.G. Towne. 1999. The keystone role of bison in North American tallgrass prairie. *Bioscience* 49: 39-50.

### **Week 6:**

TGO Ch 5

Gustafson, E.J. 1998. Quantifying landscape spatial pattern: what is the state of the art? *Ecosystems* 1:143-156.

O'Neill, R.V., J.R. Krummel, R.H. Gardner, G. Sugihara, B. Jackson, D.L. DeAngelis, B.T. Milne, M.G. Turner, B. Zygmunt, S.W. Christensen, V.H. Dale, and R.L. Graham. 1988. Indices of landscape pattern. *Landscape Ecol.* 1:153-162.

### **Week 7:**

TGO Ch 5

TGO Ch 6 not required but suggested reading

### **Week 8:**

Exercise 2

Cardille, J.A., and M.G. Turner. Understanding landscape metrics I. In S.E. Gergel and M.G. Turner, eds. *Learning Ecology: A Practical Guide to Concepts and Techniques*, pp. 85-100. Springer-Verlag, New York.

**Week 9:**

TGO Ch 4

Moore, D.M., B.G. Lee, and S.M. Davey. 1991. A new method for predicting vegetation distributions using decision tree analysis in a geographic information system. *Environ. Manage.* 15:59-71.

Smith, T.M., and M.L. Huston. 1989. A theory of the spatial and temporal dynamics of plant communities. *Vegetatio* 83:49-69.

**Week 10:**

TGO Ch 7

Romme, W.H., and D.H. Knight. 1982. Landscape diversity: the concept applied to Yellowstone Park. *BioScience* 32:664-670.

Turner, M.G., W.H. Romme, R.H. Gardner, R.V. O'Neill, and T.K. Kratz. 1993. A revised concept of landscape equilibrium: disturbance and stability on scaled landscapes. *Landscape Ecol.* 8:213-227.

White, P.S., and S.T.A. Pickett. 1985. Natural disturbance and patch dynamics: an introduction. Chapter 1 in Pickett, S.T.A., and P.S. White. Eds. 1985. *The ecology of natural disturbance and patch dynamics*. Academic Press, Orlando.

**Week 11:**

Exercise 3

Turner, M.G., D.B. Tinker, S.E. Gergel, and F. Stuart Chapin III. Landscape disturbance. In S.E. Gergel and M.G. Turner, eds. *Learning Ecology: A Practical Guide to Concepts and Techniques*, pp. 147-165. Springer-Verlag, New York. [HANDOUT]

**Week 12:** TBA - Characterizing landscape structure using satellite imagery

**Week 13:** TBA

**Week 14:**

TGO 10

Burgman, M.A., D.B. Lindenmayer, and J. Elith. Managing landscapes for conservation under uncertainty. *Ecology* 86: 2007-2017. [PDF on WebCT]

**Week 15:** TBA

**Week 16:** TBA