LANDSCAPE ECOLOGY- ENTO/GEOG 625

Fall 2009

SYLLABUS

INSTRUCTORS: Robert N. Coulson,
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Department of Entomology

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Department of Entomology

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LECTURE ROOM: HFSB 101
LABORATORY ROOM HPCT 205

TIME: Lecture (TR 12:45-1:35PM)
Laboratory (TBA)

CREDIT HOURS 3

COURSE DESCRIPTION:

Landscape ecology is the study of structure, function, and change in a heterogeneous land area composed of interacting ecosystems. Fundamental principles of landscape ecology serve as the foundation for planning, problem solving, and decision making in land-use management. We will examine basic ecological principles dealing with landscape *structure* (components of the landscape and their linkages and configurations), *function* (quantities of flows of energy, materials, and species within and among landscape elements), and *change* (alteration in the structure and function of the ecological mosaic over time). This

examination will be conducted in the context of land-use management objectives. Tools and methodologies used for spatial analysis and description will be examined in the laboratory.

COURSE GOAL: To provide a synthesis of landscape ecological principles with an applied interpretation.

EXPECTED LEARNING OUTCOME: (1) A broad-based knowledge of the basic principles of landscapes ecology, (2) an understanding of the relationship between principles of landscape ecology and land-use management, and (3) an overview of tools and techniques for spatial description, analysis, and synthesis.

FORMAT: Class discussion of lectures and reading assignments, practical laboratory.

TEXT:

Coulson, R. N. and Maria D. Tchakerian. *Basic Landscape Ecology*.
Notes: Posted at http://kelab.tamu.edu/coulson/625lecture.asp

References:

Forman, R. T. T. 1995. Land Mosaics. Cambridge University Press, Cambridge, UK, Turner, M. G., R. H. Gardner, and R. V. O'Neill. 2001. *Landscape Ecology*. Springer-Verlag. NY.

Turner, M. G., R. H. Gardner, and R. V. O'Neill. 2001. *Landscape Ecology*. Springer-Verlag, NY.

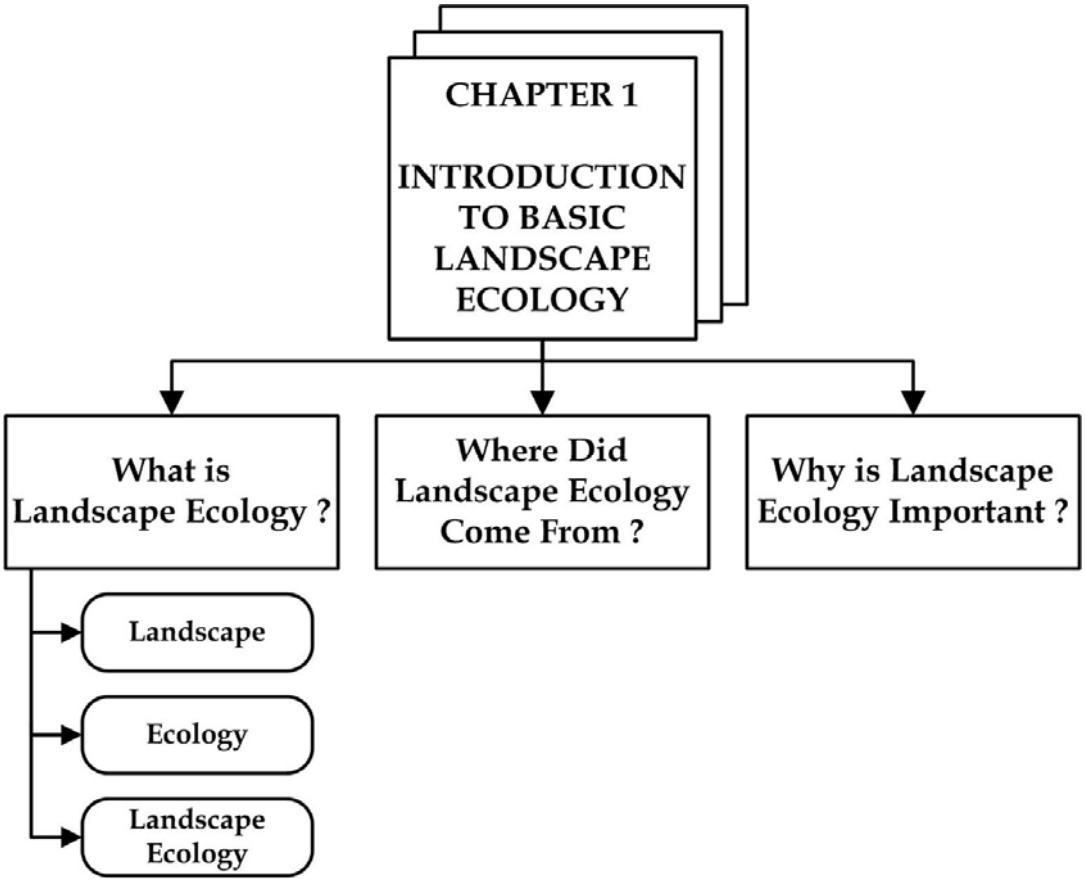
GRADING: Mid-term and final examinations, laboratory projects, group laboratory team project, and participation in class discussions. Students are required to complete scheduled reading assignments.

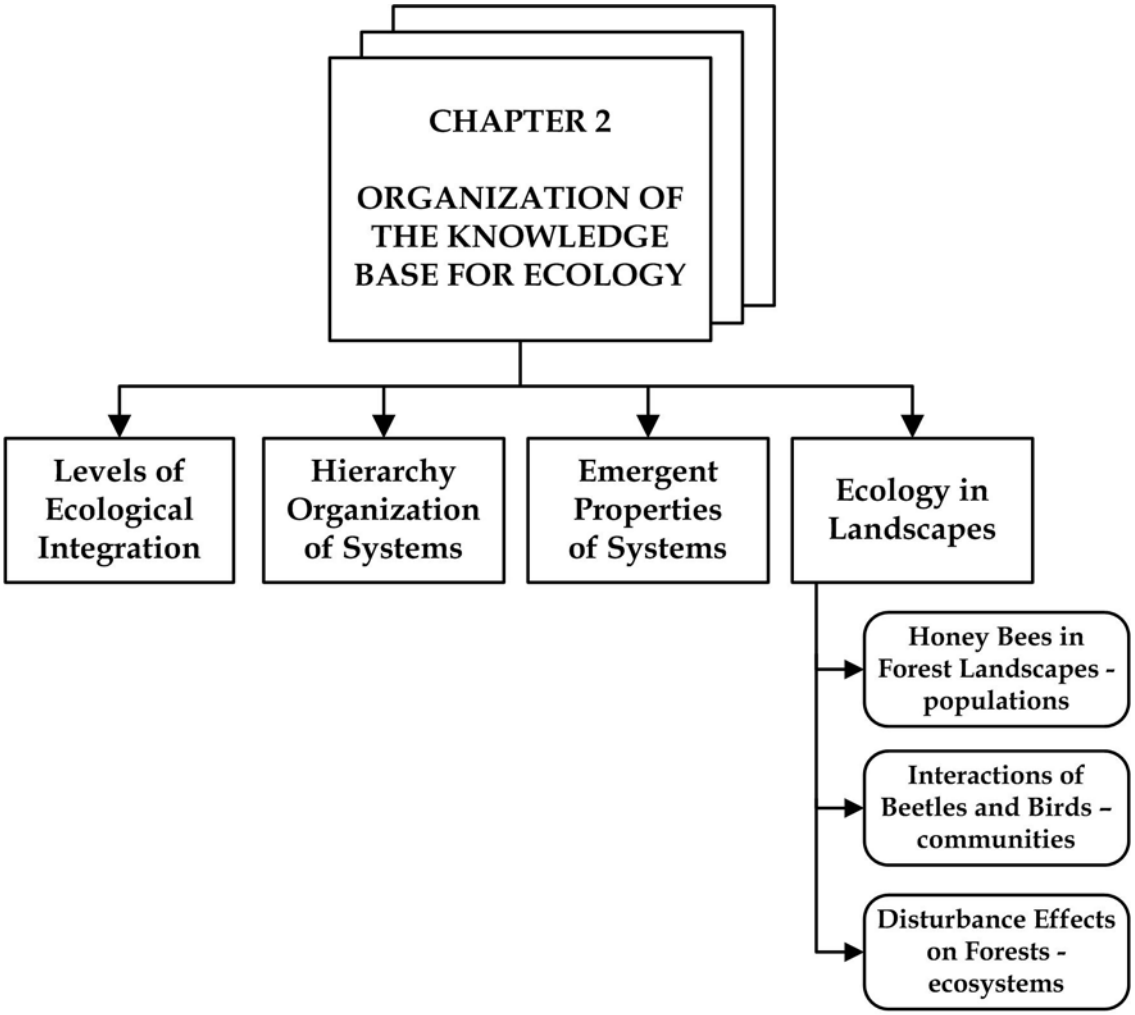
PREREQUISITES: Permission of instructors.

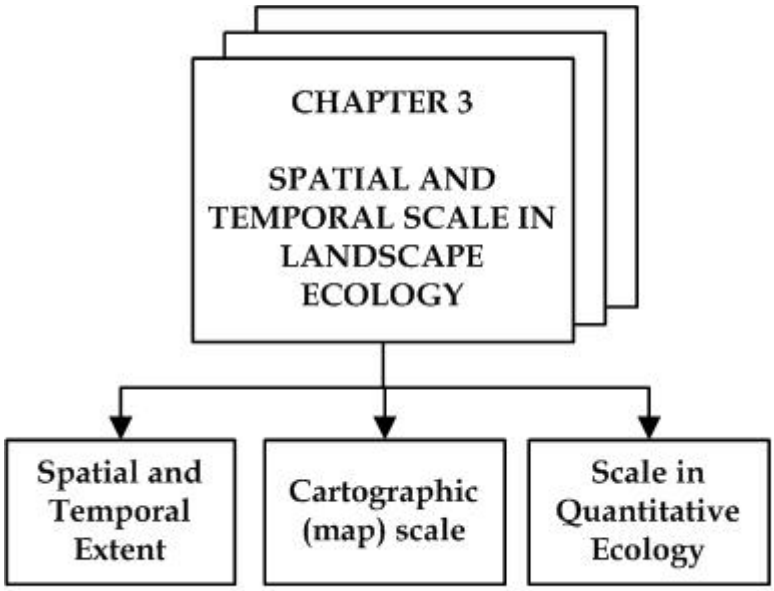
LANDSCAPE ECOLOGY – 2009

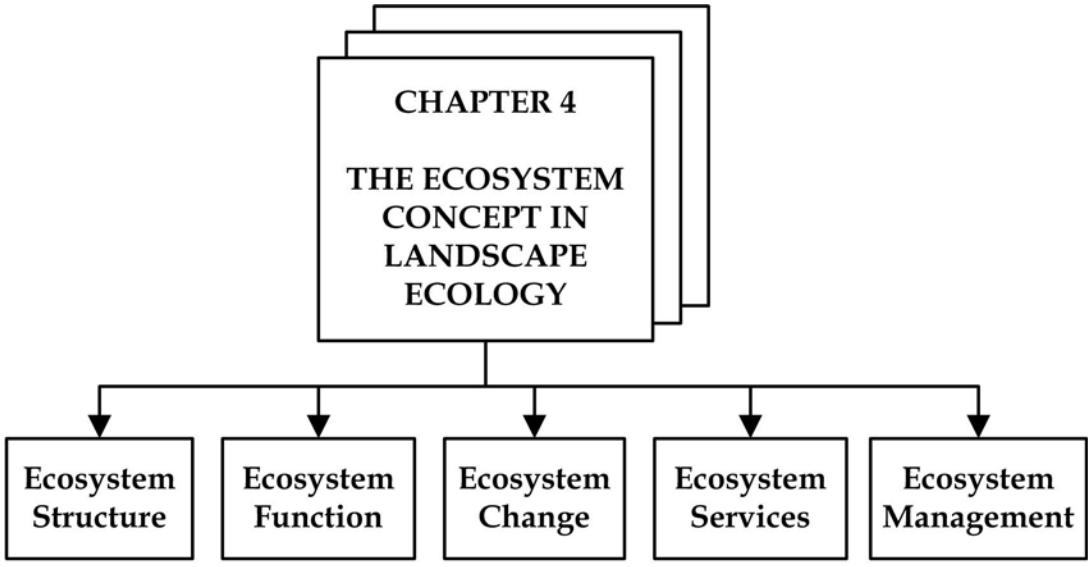
"If I had ever learned, I would be a true proficient" (Pride and Prejudice).

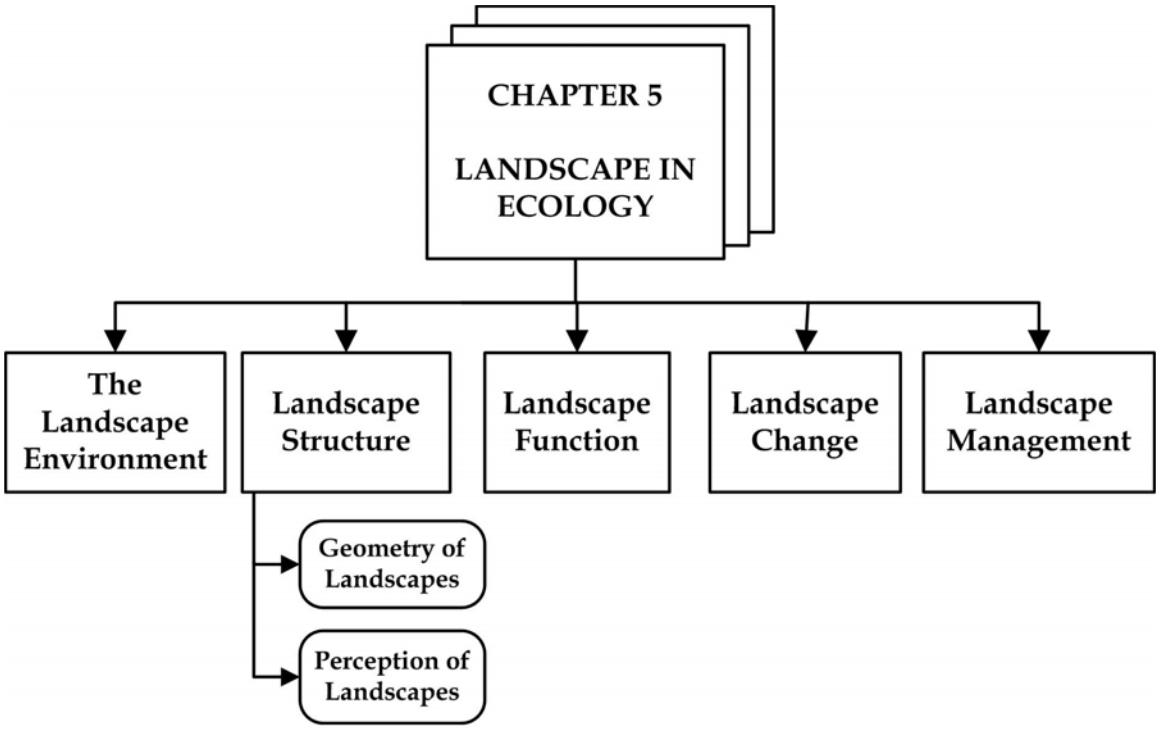
AGENDA

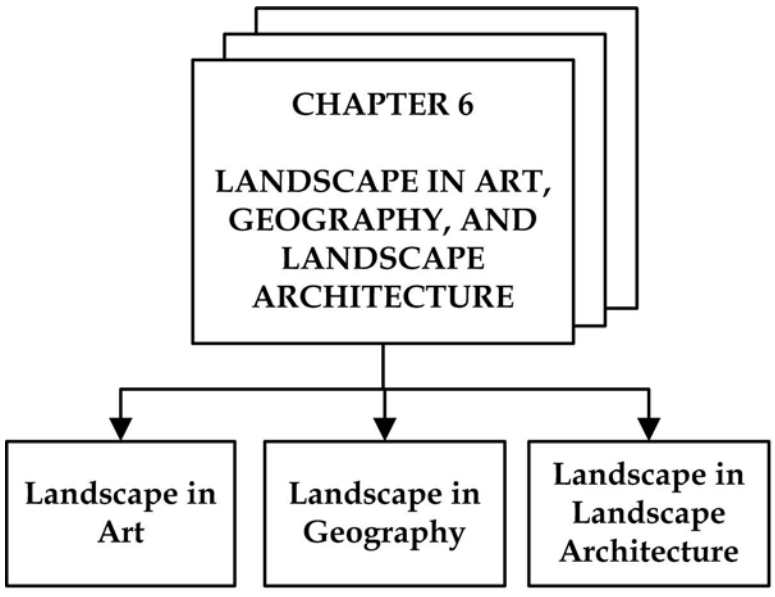

CHAPTER 1
INTRODUCTION TO BASIC LANDSCAPE ECOLOGY
What is Landscape Ecology ?
Where Did Landscape Ecology Come From ?
Why is Landscape Ecology Important ?
Landscape
Ecology
Landscape Ecology

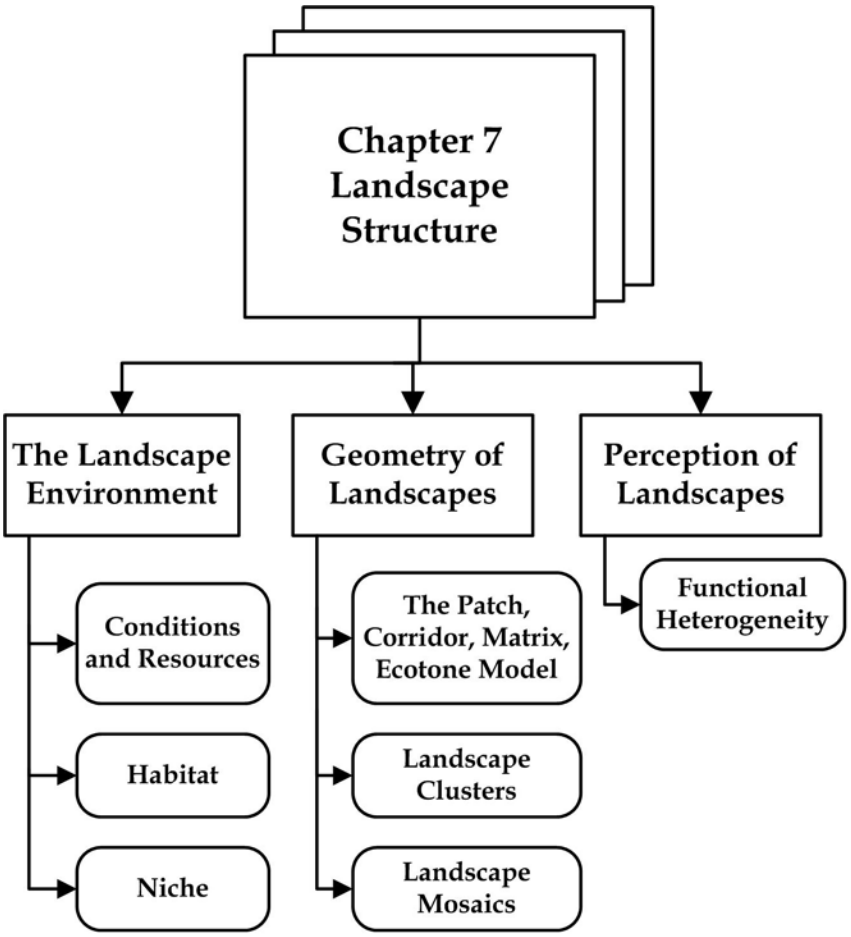

CHAPTER 2
ORGANIZATION OF THE KNOWLEDGE BASE FOR ECOLOGY
Levels of Ecological Integration
Hierarchy Organization of Systems
Emergent Properties of Systems
Ecology in Landscapes
Honey Bees in Forest Landscapes - populations
Interactions of Beetles and Birds – communities
Disturbance Effects on Forests - ecosystems

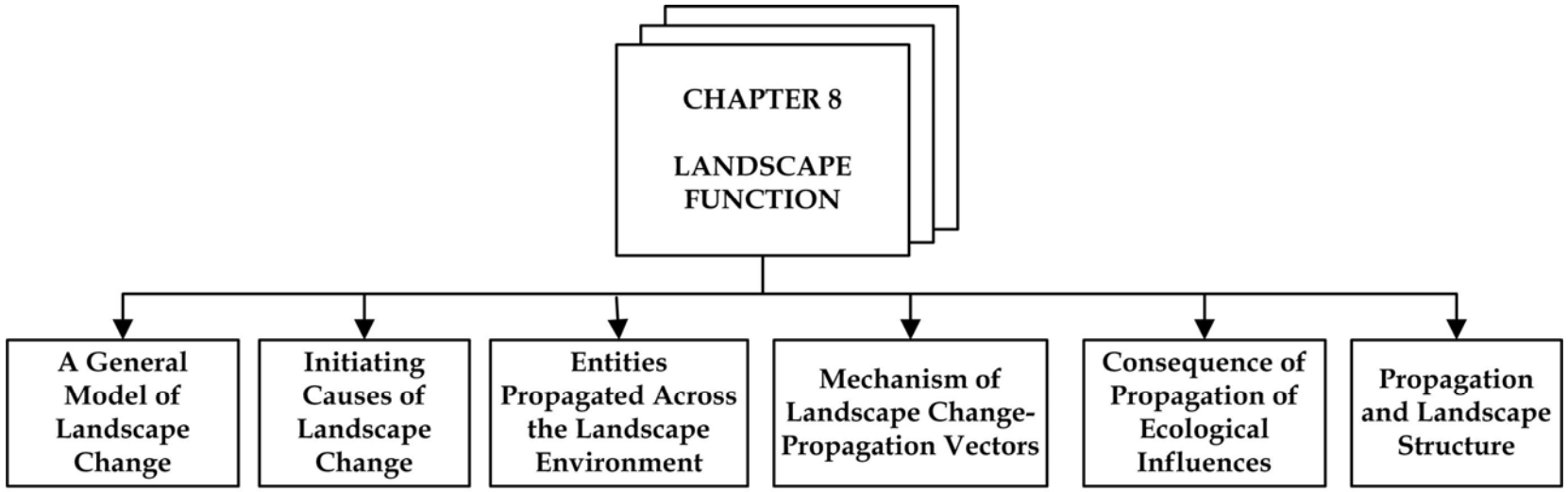

CHAPTER 3
SPATIAL AND TEMPORAL SCALE IN LANDSCAPE ECOLOGY
Spatial and Temporal Extent
Cartographic (map) scale
Scale in Quantitative Ecology

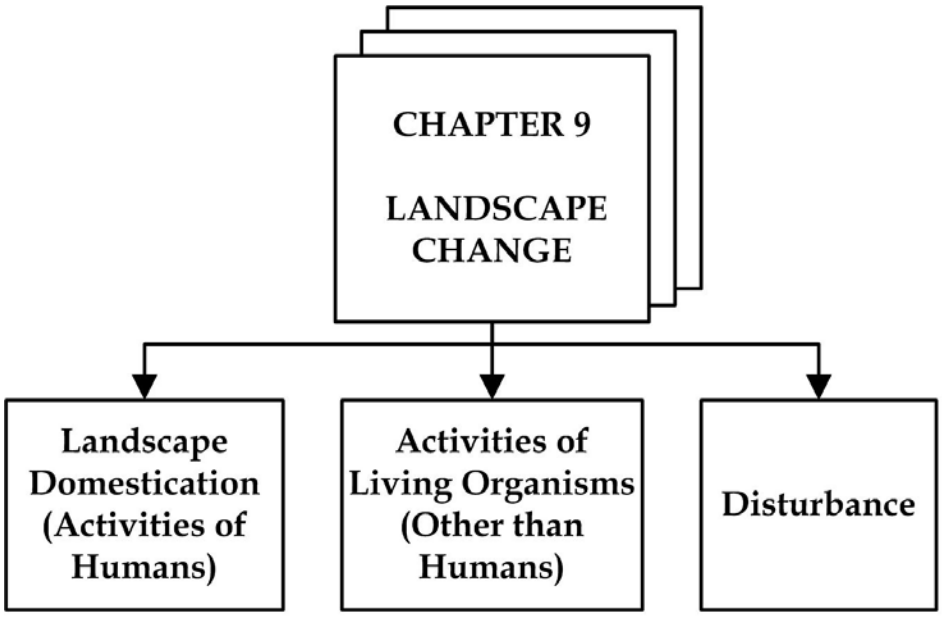

CHAPTER 4
THE ECOSYSTEM CONCEPT IN LANDSCAPE ECOLOGY
Ecosystem Structure
Ecosystem Function
Ecosystem Change
Ecosystem Services
Ecosystem Management

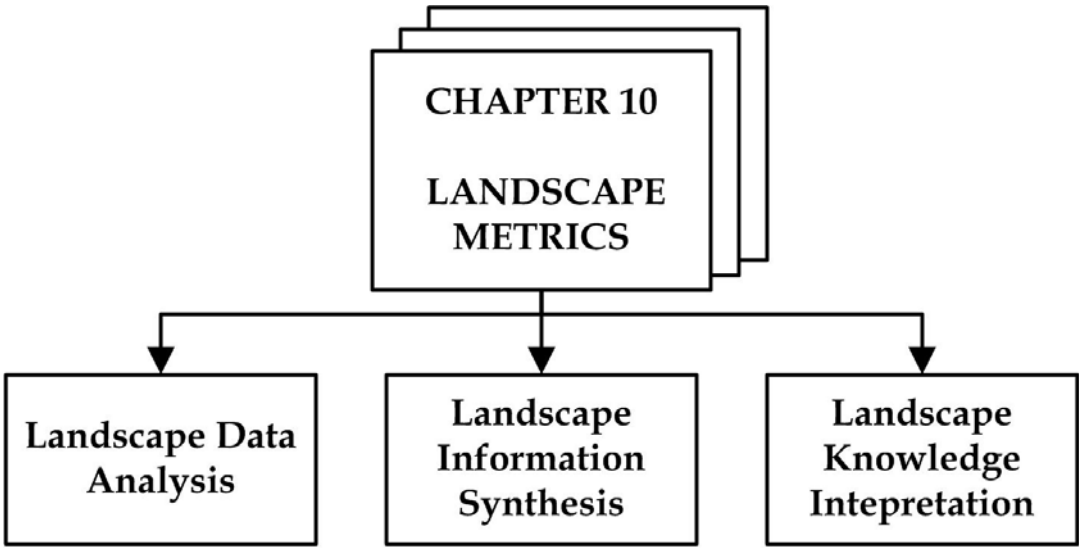

CHAPTER 5
LANDSCAPE IN ECOLOGY
The Landscape Environment
Landscape Structure
Landscape Function
Landscape Change
Landscape Management
Geometry of Landscapes
Perception of Landscapes


CHAPTER 6
LANDSCAPE IN ART, GEOGRAPHY, AND LANDSCAPE ARCHITECTURE
Landscape in Art
Landscape in Geography
Landscape in Landscape Architecture


Chapter 7
Landscape
Structure
The Landscape
Environment
Geometry of
Landscapes
Perception of
Landscapes
Conditions
and Resources
Habitat
Niche
The Patch,
Corridor, Matrix,
Ecotone Model
Landscape
Clusters
Landscape
Mosaics
Functional
Heterogeneity


CHAPTER 8
LANDSCAPE FUNCTION
A General Model of Landscape Change
Initiating Causes of Landscape Change
Entities Propagated Across the Landscape Environment
Mechanism of Landscape Change-Propagation Vectors
Consequence of Propagation of Ecological Influences
Propagation and Landscape Structure


CHAPTER 9
LANDSCAPE CHANGE
Landscape Domestication (Activities of Humans)
Activities of Living Organisms (Other than Humans)
Disturbance


CHAPTER 10
LANDSCAPE METRICS
Landscape Data Analysis
Landscape Information Synthesis
Landscape Knowledge Intepretation

Landscape Ecology Laboratory
Fall 2009

Goal: To provide an overview of tools and techniques for landscape description, analysis, and synthesis.

Laboratory exercises are primarily computer-based, and contained entirely within your lab manual. The entire chapter describing the assigned lab exercise should be read before coming to lab.

Lab reports: Lab exercises will be completed during the lab period and reports will be completed outside class. Detailed instructions will be given at the beginning of each lab.
Written lab reports should be typed. Please use the following general format:

> **Your name**
> **Date**
> **Chapter # (Title of lab)**
> **Introduction.-** Two or three sentences describing the main objective of the exercise, in your own words
> Questions.-
> 1. number each assigned question and give your answer
> 2. you do not need to include the question in your report
>
> **Summary.-** Two or three sentences summarizing the main results of the exercise
> **Attachments.-** Some labs may have graphs or figures that you can include with your report

Topics (subject to change):

Lab 1. The Fishing Trip: An Introduction to the Process of Decission Making
Lab 2. Introduction to Geographic Information Systems (GIS)
Lab 3. Corridors, Stepping Stones and Butterflies
Lab 4. Simulating Changes in Landscape Pattern
Lab 5. Quantifying Landscape Pattern: Understanding Landscape Metrics I
Lab 6. Modeling Ecological Processes
Lab 7. Animal Movement
Lab 8. Risk Assessment