

## BSCI 361 - Principles of Ecology (Spring 2015) Syllabus & Course Description

**Tu-Th 9:30-10:45, 1130 Plant Sciences; Discussion sections Monday 1-4, 1162 PLS**

**Instructor:** Dr. Daniel S. Gruner; [dsgruner@umd.edu](mailto:dsgruner@umd.edu) or 301-405-3957

Office Hours: 11–12 Tues, 11-12 Thur, and 9–10 Fri or by appointment, Plant Sciences 4142

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**Text:** “CBH”: Cain, Bowman & Hacker. 2014. *Ecology*, 3<sup>rd</sup> edition. Sinauer Associates, Inc <ISBN 978-0878939084>. Rental or access to the ebook for 180 days can be purchased at [coursesmart.com](http://coursesmart.com) or through the [bookstore](#). Used copies of the text are available at the bookstore and online. The textbook features a companion website with many helpful supplementary resources <http://sites.sinauer.com/ecology3e/>, including study guides. Copies are on reserve at McKeldin Library. **This text is required.**

**Clickers:** All students must own and [register a clicker](#) (recommended model RF-LCD, in the bookstore). The clicker channel for PLS 1130 is **28**. Mobile devices or laptop registered in [rwpoll.com](http://rwpoll.com) are no longer permitted.

**Prerequisites:** BSCI106 and MATH130 (or MATH140).

**Course Content and Objectives:** Principles of Ecology is a one-semester overview of the core principles of ecology, and the use of these principles to predict possible consequences and uncertainties associated with human-caused changes in the environment. We will examine both biotic (living) and abiotic (non-living) elements of the environment that influence the distribution and abundance of organisms. The course covers topics in the areas of individual, population, community, and ecosystem ecology, as well as humanity’s effect on natural systems.

The discussion section is designed to complement the materials covered in the text and lecture. For most discussion sessions, recent journal articles related to lecture topics will be assigned each week for discussion, in order to familiarize students with peer-reviewed journals, scientific writing, diverse methods, and the current issues in ecology. The goal is for students to practice reading and understanding scientific discourse, and to witness that the concepts presented in lecture and the text are born from observation, experimentation, and modelling, consideration of the relative weights of uncertainty and evidence, and the falsification or testing of hypotheses to build general theory. With the term paper assignment, students will choose and research an ecological topic in depth and write a scientific literature review.

**Grading Policies:** The four credit hours for this course correspond to 3 credit hours in lecture and 1 credit hour in discussion sections. However the balance of the final grade accounts for the proportional preparation time needed for success with each component. ~55% of the final grade will be determined from three exams, based primarily on lecture sessions, the text, and selected questions drawn from discussion readings; ~10% will be based on attendance and participation with the lectures via clickers; and ~35% will derive from the discussion sections via readings and assignments, participation in discussions, and the term paper.

There will be no curve on final grades. Although for numerically borderline cases I will round up to the nearest whole number, there will be no individual exceptions to this scale, so please do not ask. I am committed to equity; as such, there are no special ‘deals’. We will use the following grading percentile scale: 100-98 = A+; 97-93 = A; 92-90 = A-; 89-87 = B+; 86-83 = B; 82-80 = B-; 79-77 = C+; 76-73 = C; 72-70 = C-; 69-67 = D+; 66-63 = D; 62-60 = D-; 59 & below = F. Points breakdown and rubrics are described below.

| Your final grade in this course will be based on: | <u>Points</u> |
|---|---------------|
| Lecture participation ('clickers')                | 50            |
| Midterm Exam 1                                    | 100           |
| Midterm Exam 2                                    | 100           |
| Final Exam  | 100           |
| Discussion Assignments & Participation (8 pts ea) | 96            |
| Term Paper Topic                                  | 5             |
| Term Paper Annotated Bibliography                 | 15            |
| Term Paper  | 80            |
| <b>TOTAL POINTS</b>                               | <b>546</b>    |

## I. Lecture and Exams

Lectures will follow (but not duplicate) the basic organization of the CBH text, setting the stage with climate, biomes, and the physical and physiological constraints of the abiotic environment on individuals. We then scale from populations to interactions within populations and to diverse communities and ecosystems. We conclude with applications of ecological principles to conservation and global change. Students are expected to read the assigned CBH chapters before class.

Lectures are mandatory, and participation will be assessed through an Audience Response System ('clickers') in class. 10% of your total grade will come from clicker questions given throughout the term (2 points per lecture, excluding first two). Students accumulating more than 80% of the clicker points will earn full credit (50 points), but students below 80% will be given the proportion of total points earned. Participation is the sole criterion for earning these points, not accuracy of responses. This 20% buffer for missed questions is to allow for the possibility of forgotten clickers, battery failure, brief illness, etc., so do not ask for exemption in these cases unless for an *extended* absence with a [university-approved exemption](#).

PDF handouts on the class Canvas site ([elms.umd.edu](https://elms.umd.edu)) will be posted the day prior to class or sooner. You can print these handouts before class for your note taking (recommended), or view them on a laptop, tablet or e-reader. These handouts will not include all material covered in class, either by design (e.g., clicker questions), or because of revisions after posting, or because we'll often use the whiteboard to develop concepts. I will not post raw powerpoint files. These materials may include source content or images protected by external copyrights (all course materials are copyright protected and may not be distributed). Short recorded videos will be provided on Canvas to detail some topics and allow more time in class for questions and discussion. As with the CBH text, when provided students should view the videos before the corresponding class.

Exams will cover sections noted in the schedule, and will not be cumulative; two midterms and the final each will account for 100 points. Unless specifically exempted, all content from the relevant lectures, chapters of the textbook, and any assigned video topics is fair game for the exams. Please note that lectures complement and expand upon, but do not simply repeat, content from the text. Exams will focus on important concepts and case studies from lectures and your readings, but will not require recall of specific names, dates, or other fine details. In this digital information age, students must be able to sip from a fire hose: assaulted by massive streams of information, we must filter and retain the most central and important content from the background noise. Abundant, diverse ecological examples (case studies) are provided to help you contextualize the fundamental, core principles of ecology.

## II. Discussion Sections

Beginning February 2, each Discussion is worth 8 points total, with 4 points for attendance/participation and 4 points for your submitted discussion questions. Discussion will meet 13 times, but your lowest score will be dropped (n=12). **Active participation is essential** for discussion (2 of 4 points). Arrival more than 10 minutes late to discussion will count as an absence (0 of 4 points). Discussions meet on Mondays (1-4pm, PLS 1162) – check your section.

For each assigned reading (posted on Canvas), students will submit two discussion questions online (worth 2 points each), due at the beginning of class. More details are provided in the discussion summary guidelines. No late assignments will be accepted without [university-approved, officially documented excuses](#) (i.e. medical emergencies, excused campus activities, religious observances or family emergencies). Most discussions will consist of readings from the primary literature; one will be a practice on writing, and at least one other will be a lab or data simulation.

### III. Term Paper

A 4-6 page paper (single-spaced, 12 pt. font) will be due electronically on **Wednesday, Apr 29** (80 points). Late submissions will be reduced 5 points for each day that they are late. Your paper can focus on any of the topics in ecology covered during the course, however the TA must approve the topic. Possible topics are infinite, but for example: "Life history plasticity of salmonids" or "How biodiversity affects ecosystem function in tropical forests," but not "Environmental policy implications of X..." The paper must review a minimum of four (4) recent references from the primary literature (i.e., scientific journals) dated 2009 or later. Additional citations (from any date) are optional and encouraged, but use only peer-reviewed journals (no wikipedia, journalistic, or web citations!). The paper should briefly describe and summarize your sources, but the emphasis is on synthesizing the findings to suggest ideas and make conclusions regarding your chosen topic. Make sure to invoke and refer specifically to the basic ecological concept(s) addressed by your paper.

To help you with your paper writing process, one discussion session will be partially devoted to a review of expectations for this paper. To provide opportunities for feedback, your paper topic will be due **Wednesday, Mar 11** (5 points), and an annotated bibliography due **Wednesday, Apr 1** (15 points). The latter will be an outline of the primary points or arguments in your paper, with an annotated list of the primary literature references you will use. Preliminary research into your topics prior to these assignments is crucial. You will not be able to change your paper topic after the annotated bibliography assignment. Written academic assignments should always be in your own words. Use appropriate citations and do not plagiarize the authors of the articles in your paper.

### Course Policies:

#### I. Academic Integrity

Academic dishonesty will not be tolerated. At all times, students must adhere to the [Code of Academic Integrity](#) and the student-generated [Honor Pledge](#). We follow University policy regarding academic dishonesty. A significant percentage of plagiarism cases are unintentional, therefore it is the responsibility of students to understand plagiarism and take steps to avoid it. Passages will be selected from term papers and discussion questions throughout the term and run through plagiarism detection software. Violations of the academic integrity policy may result in a failing grade for the class with an indication of academic dishonesty noted on the transcript.

#### II. Test Days

There are no makeup dates for exams. It is the student's responsibility to inform Dr. Gruner IN ADVANCE of any religious observances or any excused school-related events. If you miss a midterm or final exam, then you must provide official documentation of an unavoidable emergency (e.g., serious illness). Students qualifying for [Disability Support Services](#) (DSS) should contact Dr. Gruner at the beginning of the course.

#### III. Course evaluations

Evaluations are an essential part of the process by which the University of Maryland seeks to improve teaching and learning, and participation by all students is strongly encouraged. The University Senate approved the implementation of a standard, online, University-wide course evaluation instrument. Each course evaluation contains a set of universal questions, and some are supplemented by questions from specific colleges. Across the University, course evaluations are administered through a web-based system dubbed [CourseEvalUM](#).

**Course Schedule:**

| Lecture | Date   | Topic   | Reading (CBH)    | Unit                      |
|---------|--------|---|------------------|---------------------------|
| 1       | 27-Jan | Introduction: What is Ecology?  | Chapter 1        | I Organisms & Environment |
| 2       | 29-Jan | The Physical Environment  | Chapter 2        |                           |
| 3       | 3-Feb  | The Biosphere: Terrestrial & Aquatic Biomes                           | Chapter 3        |                           |
| 4       | 5-Feb  | Physiological Ecology: Temperature & Water Balance                    | Chapter 4        |                           |
| 5       | 10-Feb | Physiological Ecology: Energy & Nutrients                             | Chapter 5        |                           |
| 6       | 12-Feb | Evolution   | Chapter 6        | II Evol. Ecology          |
| 7       | 17-Feb | Life Histories  | Chapter 7        |                           |
| 8       | 19-Feb | Behavioral Ecology  | Chapter 8        |                           |
| 9       | 24-Feb | Population Distribution & Abundance                                   | Chapter 9        | III Populations           |
|         | 26-Feb | <b>Midterm Exam 1 (Units I to II, Lectures 1-8, CBH 1-8)</b>          |                  |                           |
| 10      | 3-Mar  | Population Growth   | Chapter 10, part |                           |
| 11      | 5-Mar  | Demography & Life Tables  | Chapter 10, part |                           |
| 12      | 10-Mar | Population Dynamics   | Chapter 11       |                           |
|         | 11-Mar | <b>Term Paper Topic Due</b>   |                  | IV Species Interactions   |
| 13      | 12-Mar | Competition   | Chapter 12       |                           |
|         |        | <b>Spring Break Holiday</b>   |                  |                           |
| 14      | 24-Mar | Predation   | Chapter 13, part |                           |
| 15      | 26-Mar | Herbivory   | Chapter 13, part |                           |
| 16      | 31-Mar | Parasitism & Disease  | Chapter 14       |                           |
|         | 1-Apr  | <b>Annotated Bibliography Due, Term Paper</b>                         |                  |                           |
| 17      | 2-Apr  | Mutualism & Facilitation  | Chapter 15       | V Communities             |
| 18      | 7-Apr  | Species Assemblies: Communities                                       | Chapter 16       |                           |
|         | 9-Apr  | <b>Midterm Exam 2 (Units III to IV, Lectures 9-17, CBH 9-15)</b>      |                  |                           |
| 19      | 14-Apr | Community Dynamics and Succession                                     | Chapter 17       |                           |
| 20      | 16-Apr | Historical and Island Biogeography                                    | Chapter 18       |                           |
| 21      | 21-Apr | Species Diversity in Communities                                      | Chapter 19       | VI Ecosystems             |
| 22      | 23-Apr | Ecosystems: Primary Production  | Chapter 20       |                           |
| 23      | 28-Apr | Food Webs and Energy Flow   | Chapter 21       |                           |
|         | 29-Apr | <b>Term Paper Due</b>   |                  | VII Applied Ecology       |
| 24      | 30-Apr | Nutrient Supply and Cycling   | Chapter 22       |                           |
| 25      | 5-May  | Conservation Biology  | Chapter 23       |                           |
| 26      | 7-May  | Landscape Ecology & Management  | Chapter 24       |                           |
| 27      | 12-May | Global Change Ecology   | Chapter 25       |                           |
|         | 15-May | <b>Final Exam: 8–10am (Units V to VII, Lectures 18-27, CBH 16-25)</b> |                  |                           |