Ecology & Evolution

Fall **2017**

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Class Times

Mondays and Wednesdays from 14:00 - 15:15 in TNR 460. Labs meet on Fridays from 13:00-14:50 in TNR 461.

Resources

Required textbooks: Evolutionary Analysis by Herron and Freeman / Ecology by Cain et al. / Writing in the Biological Sciences by Hofmann

What will we do in ecology and evolution and what will I learn?

"The scientist is not the person who gives the right answers, he is the one who asks the right questions." – Claude Levi-Strauss

The lecture portion of the course has two primary objectives. First we will engage topics in ecology and evolution, primarily through lectures, discussions, and case studies. Second we will engage ourselves by working on skills that matter in the marketplace. These include reading assigned portions of the text prior to class and uploading lecture notes. In this way you can more readily contribute to classroom discussions. The laboratory portion of the course will focus on research, writing, and oral communication skills.

Learning Outcomes

Apply knowledge of ecological processes that operate at the level of the individual organisms, populations, communities, and ecosystems to explain patterns of species distribution and abundance.

Generalize how micro---and macro---evolutionary processes are responsible for historical and contemporary patterns of biological diversity within and among species.

Demonstrate the ability to write and orally present biological information that is articulate and grammatically correct with properly organized and documented data and ideas.

Critique your own and others' writing and oral communication skills by providing and applying useful feedback.

I love Josh Keyes' art. It is so whimsical and ecological.

"You can't even begin to understand biology, you can't understand life, unless you understand what it's all there for, how it arose - and that means evolution."

- Richard Dawkins

Ecology and Evolution and the Bigger Picture

UWSP and the Department of Biology recently revised their curriculum to include 6 credits of writing in the major, of which this course covers 4 of those credits. Skills learned in ecology and evolution are applicable to every aspect of biology from medical fields, genetics, wildlife and organismal biology, etc. They are also applicable to other fields like psychology and business.

This course fulfills 4 credits of writing in the major, a core general education program requirement.

Grading

Your grade in this class is determined by 1 laboratory report, a group research activity, daily notes uploaded to D2L, 2 homework assignments worth 25 points each (50 points), and 2 exams. The lab is worth 50 points, and the group research activity is worth 100 points. Lecture notes will be graded 20 times during the semester and each worth 5 points (20x5=100 points). Download note outlines from D2L and use your textbook or listen to required podcast to fill in pertinent information. You will upload your notes to d2l and can print a copy to bring to class. By completing notes before class everyone should know what we're talking about and be prepared to discuss the topic in class. Notes that are uploaded late will receive 0 points. There will be two non-cumulative lecture exams each worth 100 points (100x2=200 points). Thus, a total of 500 points can be earned in this class. The final points will be added up, divided by 500, and multiplied by 100; the percentage obtained will determine your grade.

Group Research Assignment (100 points)

Why? (watch *Start With Why* TED talk by Simon Sinek)

It turns out that employers are not interested in your ability to complete a lab assignment or dazzle them with your knowledge of Hardy-Weinberg Equilibrium and the Competitive Exclusion Principle. They are looking for good communication skills, the ability to work in teams, positive attitude, and problem solving skills. Knowing what employers are looking for in college graduates is important since it offers you, the student, an opportunity to work on these basic skills in all of your classes. Employers will give you specific projects to work on and you will be expected to solve problems, communicate findings, and make recommendations. You are only valuable to the company if your solutions work. Knowing this, the student that does not take a classroom assignment seriously does so at their own peril, and worse, the peril of the team.

College is a four-year job interview. One of the most profound trends over the past few decades has been a sharp shift toward scientific teamwork. We rely on group creativity because we live in a world of very hard problems and many of the most important challenges exceed the capabilities of the individual imagination (read *Imagine* by Jonah Lehrer). Because the best research now emerges from groups (consider the author lists from any primary literature paper you read this semester), the student that resists working in groups risks not developing a number of important job skills. Susan Cain, author of Quiet: The Importance of Introverts in the Workplace also believes it's vital for individuals to work on problems alone before coming to the group. This assignment is designed to develop skills employers are interested in. You will be asked to think creatively as an individual, think creatively as a team, bring your unique perspective to the team, be held accountable by the team, solve problems, and communicate findings.

Continued…

From Darwin's Journal or Researches December 7th, 1834, Chiloe Island, Chile

7th In the morning we stopped for a few minutes at a house at the extreme North point of Isd of Laylec. This was the last house; the extreme point of S. American Christendom; & a miserable hovel it was. — The latitude is about 43° 10′, which is considerably to the South of the R. Negro on the Atlantic coast of America. The people were miserably poor & as usual begged for a little tobacco. — I forgot to mention an anecdote which forcibly shows the poverty of these Indians; some days since, we met a man who had travelled 3 & ½ days on foot, on bad roads, & had the same distance to return to recover the value of an axe & a few fish! How difficult it must be to buy the smallest article, where such trouble is taken to recover so small a debt. —We had a foul wind & a good deal of swell |502| to struggle with, but we reached the Island of S. Pedro, the SE extremity of Chiloe, in the evening. When doubling the point of the harbor, Mrs Stuart & Usborne landed to take a round of angles. — A fox (of Chiloe, a rare animal) sat on the point & was so absorbed in watching their mænœvres, that he allowed me to walk behind him & actually kill him with my geological hammer.

Achievement = Skill x Effort

Angela Duckworth believes that everyone is ambitious. She defines skill and the product of talent x effort and defines achievement as skill x effort. Effort counts twice.

How?

It begins with questions. The pioneering anthropologist Claude Levi-Strauss said a scientist isn't the person that gives the right answers; he's the one who asks the right questions. Asking good questions takes lots of practice. The ability to translate observations from nature into questions that can be answered defines scientific creativity. If you are wondering if you should go to graduate school, you need to ask yourself, "Do I ask good questions? What questions interest me?" A good scientific paper begins with a good question (usually found in the introduction) and ends with more good questions (usually found in the discussion). Part of this assignment asks the question, "Do different species of squirrels around the country behave is basically the same way?" We will be collaborating with students and faculty around the country on this project.

What?

You will develop your question and make a final presentation to the class. The presentation can be a PowerPoint or Prezi and should be approximately 10 minutes in length.

Assessment

This assignment is worth 100 points; the equivalent of a full exam grade or 2 lab report. It is 20% of your final grade in the class.

***Team data contribution (25 points)*:** Each team will be contributing data for the class and for the national project. Each team will be responsible for 8 observations. I will talk more about this in lab.

***Group participation points (25 points)*:** This idea comes from years of putting students in groups and having to hear complaints that one or two people are doing all the work. Then I watched The Last Lecture by Randy Pausch (check it out – very inspirational) and learned that he always incorporated a peer assessment element into his group projects. This can be very difficult, as it requires a certain amount of objectivity that does not come naturally for most people. The natural thing to do is to reward your friends and to punish your enemies, or to work out a deal that is equitable for all (pay attention to the Social Behavior lecture for strategies). You will assign rankings to your teammates anonymously. **Including** yourself (self-assessment), you will rank each team member on a scale of 1-5, with 5 being contributed much, and 1 being contributed little to the final product.

> "Fireworks: Lesson One. Formula for gunpowder: Lesson Five."
>
> *- T-shirt worn by punk rock drummer and music teacher Martin Atkins*

***Team points (50 points)*:** *Alienus Non Diutius* is Latin for "Alone no longer". It is displayed prominently at Pixar, one of the most innovative and creative movie studios in the world. My brother's (ex) girlfriend worked for Pixar on The Incredibles, and as I watched the credits looking for her name the number of people that worked on that movie impressed me. That individual product required a lot of teamwork. Your team will receive a group grade for the project, meaning all members of the team will get the same grade. I will hand out a rubic for you to follow regarding the distribution of these points.

Academic Dishonesty

Any form of cheating on exams, quizzes, home works, or any misrepresentation of your work will result in zero (0) points being recorded for that graded component of the course. **This includes plagiarism of published works.**

Continued…

How do I succeed in this course?

The first key to success in this course is getting into the rhythm of assigned reading, upload class notes to D2L, attend and participate in lectures, download and read lab materials, and attend and participate in labs. This rhythm alone will get you 100 "free" points. This might be short of the axiom that 95% of success is simply showing up, but it's a start.

The second key to success is embracing the material and the assignments. If you grudgingly work at a class you are probably interested in, what will happen when your employer gives you a task that does not challenge you? Attitude matters and college is a relatively safe place to work on attitude.

Finally, you will probably have to study – [stupid college classes☺!] This is designed to be a writing intensive course. I give essay exams in lecture so look for 2 or 3 big ideas from each lecture that could be the basis of an essay question.

Date		Topic (Before Class)
September	6	Introduction
	8	Lab 1: Intro to lab
	11	Why Evolution is True (Watch Jerry Coyne upload notes)
	13	Variation among individuals (Upload notes ch 5)
	15	Lab 2: Intro to Taxonomy and Phylogeny
	18	Why Do Birds Sing? (Watch Podcast upload notes)
	20	Mendelian Genetics I (Upload notes ch 6)
	22	Lab 3: Introduction to experiments/literature
	25	Paper Discussion: Natural Variation (Read Lewinton)
	27	Drift (upload notes – Stearns Yale lecture)
	29	Lab 4: Hardy-Weinberg (Lab report)
October	2	Adaptation (Upload notes ch 10)
	4	Paper discussion: What is a species? (Read De Quieroz)
	6	Lab 5: Lab report peer review
	9	Mechanisms of Speciation (Upload notes ch 16)
	11	Evolution and the fossil record (Upload notes ch 18)
	13	Lab 6: Squirrel work/lab report due
	16	Aging and other life history char (Upload notes ch 13)
	18	Sexual selection (upload notes ch 11)
	20	Lab 7: Cemetery Lab: Life Tables (Homework)
	23	Human ecology using Gapminder
	25	**EXAM I**
	27	Lab 8: Introduction to Biostatistics/ HW due
	30	Overpopulated notes
November	1	Gapminder (Team project)
	3	Lab 9: Lab work/data analysis
	6	Species Tolerances and limitations (Upload notes C Ch. 4)
	8	Behavioral Ecology (Upload notes C Ch. 8)
	10	Lab 10: Excel 102/HW due
	13	Population Distribution (Upload notes C Ch. 9)
	15	Population Growth (Upload notes C Ch. 10)
	17	Lab 11: Population Modelling
	20	Competition (Podcast notes)
	22	Predation and Herbivory (Upload notes C Ch. 13)
	24	THANKSGIVING
	27	The Nature of Communities (Upload notes C Ch. 16)
	29	Change in Communities (Cain Ch. 17)
December	1	Lab 12: Populus lab
	4	Biogeographic Patterns (Upload notes C 18)
	6	Species Diversity (C Ch. 19)
	8	Lab 13: Lab work/data analysis
	11	Ecosystems I: Production (Upload notes Ch. 20)
	13	Ecosystems II: Energy flow (Ch. 21)
	15	Lab 14: Final Presentations
	20	**Final Exam – 10:15-12:15 (Wednesday)**

The top 10 skills employers say they seek in college graduates in order of importance.

1. Ability to work in a team.
2. Ability to make decisions and solve problems.
3. Ability to plan, organize and prioritize work.
4. Ability to communication with people inside and outside an organization.
5. Ability to obtain and process information.
6. Ability to analyze quantitative data.
7. Technical knowledge related to the job.
8. Proficiency with computer software programs.
9. Ability to create and / or edit written reports.
10. Ability to sell and influence others.

Source: The National Association of Colleges and Employers (NACE)

"Individual commitment to a group effort – that is what makes a team work, a company work, a society work, a civilization work."
- Vince Lombardi

If updates are made to this syllabus the most recent syllabus will be posted on D2L. I will also send any updated syllabus to the class via email as an attached file.