

POPULATION AND COMMUNITY ECOLOGY SYLLABUS

INSTRUCTOR

EXAMPLE SYLLABUS

Erik Jules

REACHING THE INSTRUCTOR

Office: House 18, Room 203*

*Because my office is not accessible to some people with disabilities, I will hold my Monday and Wednesday office hours in my research lab (Science D, Room 167).

Office Hours:

- Mondays 3:00-4:00 (Science D, Room 167)
- Wednesdays 2:00-3:00 (Science D, Room 167)
- Fridays 9:00-11:00 (House 18, Room 203)

Phone: 826-3346; Email: esj4@humboldt.edu

LOCATION & TIME

- Science D, Room 157 (or GH 215 for computer labs)
- Monday & Wednesday 8:30-9:50; Tuesday 2:00-5:00

TEXTBOOKS

Gotelli, N.J. 2008. *A primer of ecology, fourth edition*. Sinauer, Sunderland, Massachusetts.

COURSE GOALS

There are four main goals of this course:

1. Learn the fundamental patterns of population and community dynamics.
2. Gain experience with mathematical models used to describe populations and communities.
3. Gain experience in reading and synthesizing the primary literature in ecology.
4. Increase skills in oral and written presentation of ideas.

GRADING

Grades will be based on exams, quizzes, lab assignments, and a group project. All exams and quizzes are cumulative (except where noted), in that ideas and topics developed since the beginning of the course are always testable.

Final grades will be based on the traditional scheme of $\geq 90\%$ = A, $\geq 80\%$ = B, etc... I will consider individual cases for students with scores near boundaries.

POINTS:

Quizzes	70 pts
Mid-term Exam	100 pts
Final Exam	125 pts
Lab write-ups	75 pts
Group Project	30 pts
TOTAL:	400 pts*

* Graduate students enrolled in 534 will have an additional 50 pts used to calculate their grade (see below) of a total of 450 points.

GRADUATE CREDIT (FOR THOSE ENROLLED IN BIOL 534)

In order to receive graduate credit for this course, there will be additional expectations of students in this course. Graduate students will have additional readings on which they will be tested during exams. Also, each student will be asked to complete one extra task during the semester. We will discuss this in depth.

GROUP PROJECT

You will work in groups of ~3-4 people and together explore an applied, real-world ecology problem. The finished product will include several parts, including written and oral presentations. You will choose an example of decisions being made about the management of populations, how they were made, what information was used and analyzed, and how the management decisions influenced the outcome. A detail of this group project will be given elsewhere.

STUDENTS WITH DISABILITIES

Persons who wish to request disability-related accommodations should contact the Student Disability Resource Center in House 71, 826-4678 (voice) or 826-5392 (TDD). Some accommodations may take up to several weeks to arrange. <http://www.humboldt.edu/~sdr/>

ADD/DROP POLICY

Students are responsible for knowing the University policy, procedures, and schedule for dropping or adding classes. <http://www.humboldt.edu/~reg/regulations/schedadjust.html>

EMERGENCY EVACUATION

Please review the evacuation plan for the classroom (posted on the orange signs) , and review http://studentaffairs.humboldt.edu/emergencyops/campus_emergency_preparedness.php for information on campus Emergency Procedures. During an emergency, information can be found campus conditions at: 826-INFO or www.humboldt.edu/emergency

ACADEMIC HONESTY

Students are responsible for knowing policy regarding academic honesty:
http://studentaffairs.humboldt.edu/judicial/academic_honesty.php or
<http://www.humboldt.edu/~humboldt/catalogpdfs/catalog2007-08.pdf>

ATTENDANCE AND DISRUPTIVE BEHAVIOR

Students are responsible for knowing policy regarding attendance and disruptive behavior:
http://studentaffairs.humboldt.edu/judicial/attendance_behavior.php

MISCELLANEOUS

MISSED EXAMS: If you need to take one of the exams on a different date, you must talk with me at least two weeks beforehand. Missed exams cannot be made up, other than in the case of emergencies.

MISSED QUIZZES: Same as for missed exams.

COURSE SCHEDULE

WEEK	LECTURE & LAB TOPICS	DUE*	READINGS
1	Introduction / Exponential growth		Chapter 1
	Lab: Spreadsheet basics & exponential growth		
	Exponential growth, continued...*		
2	Logistic growth	Lab 01	Chapters 2 & 3 Gleick 1987 Becks & Arndt 2008**
	Lab: Logistic growth & Discussion of reading		
	Structured models		
3	LABOR DAY – No meeting		Chapter 3 Morris et al. 1999 Morris et al. 1999b**
	Lab: Structured population models	Lab 02	
	Structured population models		
4	Stochastic processes & sensitivity analysis	Lab 03	Gross et al. 1998 Berger & Conner 2008 Doak et al. 1994**
	Lab: Building structured models & GP		
	Discussion of reading		
5	Population viability analysis	Lab 04	Farrington et al. 2008 Crowder et al. 1994**
	Lab: Field trip for population monitoring		
	Discussion of reading	GP Selected	
6	Discussion of reading		Arnold et al. 2006 Simberloff 1988**
	Lab: Field trip for population monitoring		
	Group project meetings		
7	Metapopulations		Chapter 4 Lande 1988**
	Lab: Field trip for population monitoring		
	Metapopulations	GP Papers	
8	Discussion of reading		Griffin et al. 2008
	Lab: Group project presentations	GP Presentations	
	Mark-recapture		
9	Mark-recapture		Chapter 6 Crooks & Soule 1999**
	Lab: EXAM I	Exam	
	Predator-prey dynamics		
10	Predator-prey dynamics		Gilg et al. 2003 Schmitz 2008
	Lab: Discussion of readings	Lab 05: <i>Eriogonum</i>	
	Discussion of readings		
11	Community ecology primer		Chapter 9 Grime et al. 2008**
	Lab: TBA		
	The nature of communities		
12	Community assembly & succession		Fargione et al. 2003 Harpole & Tilman 2007**
	Lab: Community analysis		
	Causes and consequences of diversity		
13	Discussion of readings		Haddad et al. 2011 Gross 2008
	Lab: Discussion of readings	Lab 06	
	Positive interactions		
	THANKSGIVING		
14	Indirect trophic cascades		Roemer et al. 2002 Epanchin et al. 2010 Estes et al 2011**
	Lab: Lecture, cont &, Discussion of readings		
	Discussion of readings		
15	Community genetics		Crutsinger et al. 2006
	Lab: Discussion of readings		
	TBA		
Dec 12th	FINAL EXAM: Monday, 8:00-9:50	Exam	

* Quizzes are not included here, but can happen on any Wednesday.

** Required reading for graduate credit; optional for others.

IMPORTANT DATES

Component	Due Date
Group Project; paper selected	Sept. 21 (8:30 am)
Group Project; full write-up due	Oct. 5 (8:30 am)
Group Project; oral presentation	Oct. 11 (2:00 pm)
Mid-term Exam	Oct. 18 (2:00 pm)
Final Exam	Dec. 12 (8:00 am)

IMPORTANT GREEK LETTERS TO KNOW

<i>Letter name</i>	<i>lower case</i>	<i>CAPITAL</i>
alpha	α	A
beta	β	B
gamma	γ	Γ
delta	δ	Δ
epsilon	ϵ	E
zeta	ζ	Z
eta	η	H
theta	θ	Θ
iota	ι	I
kappa	κ	K
lambda	λ	Λ
mu	μ	M
nu	ν	N
xi	ξ	Z
omicron	\omicron	O
pi	π	Π
rho	ρ	P
sigma	ς	Σ
tau	τ	T
upsilon	υ	Y
phi	ϕ	Φ
chi	χ	X
psi	ψ	Ψ
omega	ω	Ω

Population & Community Ecology Readings

- Arnold, J.M, Brault, S. and Croxall, J.P. 2006. Albatross populations in peril: A population trajectory for Black-Browed Albatrosses at South Georgia. *Ecological Applications* 16:419-432.
- Berger, K.M. & Conner, M.M. 2008. Recolonizing wolves and mesopredator suppression of coyotes: impacts on pronghorn population dynamics. *Ecological Applications* 18:599–612.
- Crutsinger, G. M., M. D. Collins, J. A. Fordyce, Z. Gompert, C. C. Nice, and N. J. Sanders. 2006. Plant genotypic diversity predicts community structure and governs ecosystem process. *Science* 313:966-968.
- Epanchin, P.N., R.A. Knapp, S.P. Lawler. 2010. Nonnative trout impact an alpine-nesting bird by altering aquatic-insect subsidies. *Ecology* 91:2406-2415.
- Fargione, J.; Brown, C. S.; Tilman, D. 2003 Community assembly and invasion: an experimental test of neutral versus niche processes. *Proceedings of the National Academy of Sciences* 100:8916-8920.
- Farrington, S.J. R. Muzika, D. Drees, and T.M. Knight. 2008. Interactive effects of harvest and deer herbivory on the population dynamics of American ginseng. *Conservation Biology* 23:719-728.
- Gilg, O., I. Hanski, and B. Sittlers. 2003. Cyclic dynamics in a simple vertebrate predator-prey community. *Science* 302:866-868.
- Gotelli, N.J. 2008. A primer of ecology, fourth edition. Sinauer, Sunderland, Massachusetts.
- Gleick, J. 1987. Chapter 3: Life's ups and downs. In *Chaos: the making of a new science*. Penguin Publishers.
- Griffin, S. C., M. L. Taper, R. Hoffman, and L. S. Mills. 2008. The case of the missing marmots: are metapopulation dynamics or range-wide declines responsible? *Biological Conservation* 141:1293-1309.
- Gross, K., J. R. Lockwood III, C. C. Frost, and W. F. Morris. 1998. Modeling controlled burning and trampling reduction for conservation of *Hudsonia montana*. *Conservation Biology* 12:1291-1301.
- Gross, K. 2008. Positive interactions among competitors can produce species-rich communities. *Ecology Letters* 11: 929-936.
- Haddad, N.M., Crutsinger, G.M., Gross, K., Haarstad, J. and Tilman, D. 2011. Plant diversity and the stability of foodwebs. *Ecology Letters* 14:42–46.
- Hector, A., Y. Hautier, P. Saner, L. Wacker, R. Bagchi, J. Joshi, M. Scherer-Lorenzen, E. M. Spehn, E. Bazeley-White, M. Weilenmann, M. C. Caldeira, P. G. Dimitrakopoulos, J. A. Finn, K. Huss-Danell, A. Jumpponen, C. P. H. Mulder, C. Palmborg, J. S. Pereira, A. S. D. Siamantziouras, A. C. Terry, A. Y. Troumbis, B. Schmid, M. Loreau. 2010. General stabilizing effects of plant diversity on grassland productivity through population asynchrony and overyielding. *Ecology* 91:2213-2220.
- Morris, W.F., D.F. Doak, M. Groom, P. Karieva, and J. Fieberg, L. Gerber, P. Murphy, and D. Thomson. 1999. Chapter 4: Projection matrix models. In *A practical handbook for population viability analysis*. The Nature Conservancy, Washington, D.C.
- Roemer, G.W, C.J. Donlan, III and F. Courchamp. 2002. Golden eagles, feral pigs and insular carnivores: how exotic species turn native predators into prey. *Proceedings of the National Academy of Sciences* 99:791-796.
- Schmitz, O.J. 2008. Effects of predator hunting mode on grassland ecosystem function. *Science* 319:952-954.

Graduate Student Readings

- Becks, Lutz, and Hartmut Arndt. 2008. Transitions from stable equilibria to chaos, and back, in an experimental food web. *Ecology* 89:3222–3226.
- Crooks, K. R., and M. E. Soulé. 1999. Mesopredator release and avifaunal extinctions in a fragmented system. *Nature* 400:563–566.
- Crowder, L. B., D. T. Crouse, S. S. Heppell, and T. H. Martin. 1994. Predicting the impact of turtle excluder devices on loggerhead sea turtle populations. *Ecological Applications* 4:437–445.
- Doak, D. F., P. Kareiva, and B. Klepetka. 1994. Modeling population viability for the desert tortoise in the Mojave desert. *Ecological Applications* 4:446–460.
- Estes, J.A. + 23 co-authors. 2011. Trophic Downgrading of Planet Earth. *Science* 333:301–306.
- Grime, J. P., J. D. Fridley, A. P. Askew, K. Thompson, J. G. Hodgson, and C. R. Bennett. 2008. Long-term resistance to simulated climate change in an infertile grassland. *Proceedings of the National Academy of Sciences (USA)* 105:10028–10032.
- Harpole, W. S., and D. Tilman. 2007. Grassland species loss resulting from reduced niche dimension. *Nature* 446:791–793.
- Lande, R. 1988. Genetics and demography in biological conservation. *Science* 241:1455–1460.
- Morris, W.F., D.F. Doak, M. Groom, P. Karieva, and J. Fieberg, L. Gerber, P. Murphy, and D. Thomson. 1999. Chapter 3: Using census counts over several years to assess population viability. In *A practical handbook for population viability analysis*. The Nature Conservancy, Washington, D.C.
- Simberloff, D. S. 1988. The contribution of population and community biology to conservation science. *Annual Review of Ecology and Systematics* 19:473–511.