

Biology 4117/5151 WA Advances in Contemporary Ecology - Course Outline 2018

Instructor: Dr. S. Hecnar

Lectures: 2:30-4:00 pm WED & FRI in AT 2019.

Office hours: 4:00-5:00 pm WED & FRI

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Course Description: An investigation of topics in contemporary ecology with an emphasis on large-scale patterns of abundance and distribution of organisms in nature. Topics covered will include the importance of scale in ecology, latitudinal patterns of species richness, range size theory, and the relationship between abundance and distribution. This course will include instruction and practice in compilation, analysis and interpretation of macroecological data.

This year we will focus on recent advancements in basic concepts and examine how the field is changing. We will combine lectures, readings, presentations, and discussions focussing on major concepts in ecology.

Required Textbooks:

Levin, S.A. (Ed.). 2012. *The Princeton Guide to Ecology*. Princeton University Press, Princeton, paperback, ISBN: 978-0-691-15604-0 *A concise encyclopaedic account of concepts and topics in both basic and applied ecology*. The 2009 hardcover edition can be used as an alternative.

Optional Textbooks:

Brown, J.H. 1995. *Macroecology*, University of Chicago Press, paperback, ISBN 0-226-07615-6 *The first macroecology textbook produced. Although several years old, the book provides a good inexpensive introduction to the field and background reading for the course.*

Dodds, W.K. 2009. *Laws, Theories, and Patterns in Ecology*. University of California Press, Berkeley ISBN: 978-0-520-26041-2. *A recent textbook that examines the complexity of ecology relative to other sciences and discusses what can be considered laws, theories or patterns.*

Gaston, K.J. 2003. *The Structure and Dynamics of Geographic Ranges*. Oxford University Press, paperback, ISBN 0-19-852641-5 *An up to date synthesis of the field of aerography.*

Recommended Books for Further Reading:

Blackburn, T.M. and K.J. Gaston (eds). 2003. *Macroecology: Concepts and Consequences*. Blackwell Publishing, paperback, ISBN 0-521-54932-9 *The most recent textbook on the topic of macroecology with chapters written by experts on many of the important questions in the field.*

Gaston, K.J. 1994. *Rarity*. Chapman & Hall, paperback, ISBN 0-412-47510-3. *A thorough treatment of the topic of rarity in a compact volume.*

Gaston, K.J., and T. Blackburn. 2000. *Pattern and Process in Macroecology*. Blackwell Science UK, paperback, ISBN 0-632-05653-3 *An advanced and up to date summary of the field that uses Britain's avifauna as a case study. An excellent but expensive book.*

Hanski, I. 1999. *Metapopulation Ecology*. Oxford University Press, paperback, ISBN 0-19-854065-5 *A*

comprehensive synthesis of the field of metapopulation ecology covering both theoretical and empirical research.

Holyoak, M., M.A. Liebold, and R.D. Holt. (Eds.). 2005. *Metacommunities: Spatial Dynamics and Ecological Communities*. University of Chicago Press, paperback, ISBN: 0-226-35064-9. *The first book on the emerging perspective of metacommunities in ecology.*

Hubbell, S.P. 2001. *The Unified Neutral Theory of Biodiversity and Biogeography*. Princeton, paperback, ISBN 0-691-02128-7 *A new mathematical theory that extends MacArthur and Wilson's island model in an attempt to merge the fields of ecology and biogeography.*

Maurer, B.A. 1999. *Untangling Ecological Complexity: the Macroscopic Perspective*. University of Chicago Press, paperback, ISBN 0-226-51133-2 *An interesting perspective on complexity in ecological communities written by one of the co-founders of the sub-discipline of macroecology. Maurer provides an extensive justification for using the macroecological approach and in-depth discussion of the geographic range, large-scale assembly of communities, and evolution at the macro-scale.*

Ricklefs, R.E., and D. Schluter. 1993. *Species Diversity in Ecological Communities: historical and geographical perspectives*. University of Chicago Press, paperback, ISBN 0-226-71823-9 *An influential edited volume that coalesced changing viewpoints in ecology. Chapters are uneven, but many provide an interesting read.*

Rosenzweig, M.L. 1995. *Species diversity in space and time*. Cambridge University Press, paperback, ISBN 0-521-49952-6 *An entertaining and informative book that provides a very thorough treatment of the role of area in producing patterns of species diversity.*

Journals: The library subscribes to several primary international ecological journals such as *Ecology*, *Ecology Letters*, *American Naturalist*, *Oikos*, *Oecologia*, *Conservation Biology*, *Biological Conservation*, *Diversity and Distributions*, *Journal of Biogeography*, *Trends in Ecology and Evolution* (there are many others). Occasionally papers are published in general science journals such as *Science* or *Nature* or in taxon specific journals. A good way to search for papers is to use one of the subscribed data sources through the library (Web of Science, Biological Abstracts) or via the worldwide web using Google Scholar.

Marking Scheme:

4117: Midterm 20%, Presentation 20%, Written Summary 10%, Discussion 20%, Final Written Exam 30%.

5151: Midterm 20%, Presentation 20%, Written Summary 10%, Discussion 20%, Final Written Exam 20%, Final Oral Exam 10%.

Your mark will thus be comprised of the quality of your presentations, participation in discussions and more formal examinations.

Goals & Expectations: This course, like the ecological concepts it studies, is constantly evolving. Its goal is to provide a contemporary large-scale perspective to graduate students or senior undergraduates who intend on pursuing graduate studies in ecology. The course is taught at an advanced level and assumes that the student has a solid foundation in basic ecology. The course is demanding, besides covering much lecture material, students must prepare for and take an active part in discussions, and complete assignments on their own time. Maintaining good attendance is for your own benefit as participation in discussions is graded. Missed examinations will be graded zero unless you have a bonafide excuse and supporting documentation. If you do miss an exam, contact the instructor as soon as possible. If you have a contagious illness do not attend class but

inform the instructor as soon as possible.

Presentation(s): Students will provide one or more presentations of a key ecological concept or topic. The topic may be either in basic or applied ecology but must be approved by the instructor. The student(s) should provide a 15 to 20 minute presentation using PowerPoint, overheads, chalkboard, or a combination of methods. The presentation should aim to define and provide a contemporary review of the topic. The goal is to ensure that the audience will have a firm grasp of what the concept is, why it is important, what its implications are, how it is used, etc. Graduate students will be expected to use the earliest time slots, followed by undergraduates (fourth year followed by third year). The presentation will be followed by a discussion providing an opportunity to ask and answer questions.

Written Summary: Student presenters should provide a one to two page typed summary of their concept or topic as a handout for the class. An electronic copy (Word .doc or .pdf) must be sent to the instructor.

Reading and Discussion – Paper: The student(s) doing the presentation will lead the discussion and critique of a paper related to the concept or topic presented. This paper must be from the recent ecological literature and preapproved by the instructor. The student(s) will provide a summary of the paper, additional information, opinions or criticism, and pose some questions to stimulate and continue discussion. The paper should be sent out to the class the week preceding the presentation so that all will have sufficient time to peruse the paper. We are setting up a Desire2Learn website to facilitate exchange of materials and communications in the course. It is thus important to have your seminar date set, and topic and paper approved early.

Examinations: Format will vary according to the enrollment in the course but may include a mix of different types of questions such as true or false, multiple choice, fill in the blank, short answer, essays, quantitative problems, pattern interpretation, drawings. If class size is small, questions may be exclusively essay format. Graduate students will be given an oral examination at the end of the course in addition to all other requirements.

Reserve Materials: Discussion papers and instructions for assignments will be emailed or posted to the D2L course website for students to access before class. It is the student's responsibility to regularly check their email inbox/D2L site to download and peruse materials before class or copy reserve materials as required and return originals in good condition to the reserve folder(s). If a student needs help to find additional material on some topic of interest they should see the instructor.

Tentative Schedule (Specific items T.B.A.)

Jan.	10	W	Organizational Meeting and Introduction
	12	F	Lecture – Introduction
	17	W	Hecnar – Metapopulations to Metacommunities
	19	F	Scheduling presentations – general discussion
	24	W	
	26	F	
	31	W	

Feb.	02	F	
	07	W	
	09	F	
	14	W	
	16	F	
	21	W	Study Week
	23	F	Study Week
	28	W	Midterm Exam
Mar.	02	F	
	07	W	
	09	F	
	14	W	
	16	F	
	21	W	
	23	F	
	28	W	
	30	F	Good Friday – University Closed
Apr.	04	W	
	06	F	Last Class
	10	TU	Makeup day for Good Friday Holiday
