EVOLUTIONARY ECOLOGY (BIO 225) - Fall 2015
Lecture 10:00 MWF (Spratt 205)
Labs 8:00-10:50 or 2:00-4:50 Tues. (Remington 217)
Course Website: www.missouriwestern.edu/biology/bio225/

Instructor: Dr. Mark Mills
Associate Professor of Biology
Email: mmills3@missouriwestern.edu
Office: AH 237E; ext. 4384
Office Hours: 8-9:00 MWF & 2-3:00 MW
Other times by appointment

CATALOG DESCRIPTION: 4 hours. Covers principles of ecology and evolution, including field and research methods. Three hours lecture and three hours lab. Prerequisites: A grade of C or above in BIO105. LAS Computer Literacy.

MY DESCRIPTION: The study of the relationships of living organisms to each other and their environment; analysis of structure and succession of natural communities; analysis of population control mechanisms; current problems in ecology. I especially like Charles Kreb’s (2001) definition, which he borrowed from Andrewartha (1971), “Ecology is the scientific study of the interactions that determine the distribution and abundance of organisms.” Ecology, in my opinion, is THE most important Biology course you will take because it incorporates all other areas of biology plus physics, chemistry, statistics and mathematics, AND we are all part of ecosystems.

RATIONAL: Ecology is a multidisciplinary field of science; that is, many areas of study are brought together to help the student understand the complex nature of the interactions between living things and the biotic and abiotic environments. This course will help students to better understand the “big picture” of life on earth and therefore will help them make informed decisions and develop ethical values relating to life and the environment. Ecology is a required course for all Biology majors and a prerequisite to many upper level courses (e.g., Ornithology, Herpetology, Mammalogy, Entomology, Local Flora, Plant Systematics, and Vertebrate Biology).

GOALS: The goal of this course is to provide students with a basic understanding of the field of ecology. Students should leave the course knowing that interactions at all levels of biological organization affect the distribution and abundance of life on earth. Students will also be introduced to the methodologies of ecology and science in general.

COMPETENCIES: This course is intended for sophomore biology majors and provides a thorough introduction to the field of ecology. After taking this course, a student should be able to:
1. Apply the scientific and comparative methods to the study of ecology.
2. Know and use the basic terminology used in discussion of ecology.
3. Apply the basic theory, mechanisms, and outcomes of evolution to ecology.
4. Apply basic statistical and mathematical concepts to the study of ecology.
5. Discuss and explain the major types of interactions (both physical and biological) which determine the distribution and abundance of organisms.
6. Read and discuss current and classic ecological studies
7. Demonstrate and use field and laboratory techniques associated with the study of ecology.
TEXTBOOKS:
REQUIRED

OPTIONAL

I expect you to read your textbooks. I will often refer to page numbers, tables, and figures from your text while lecturing; therefore, it would benefit you to bring your textbooks to class and lab.

OTHER REQUIRED SUPPLIES:
- Laboratory notebook with duplicate pages (available in the bookstore)
- Turning Technologies “Clicker” for attendance and quizzes (available in the bookstore)

COURSE REQUIREMENTS  (I will announce any changes in class and/or via email):
Exams: Four exams will cover both lecture and laboratory material, and they will consist of short answer and essay questions. The fourth exam will be administered during the time reserved for the final exam.

Laboratory: We will be conducting our laboratory exercises in the lab and in the field, so always come prepared to go outside. We may take local (e.g., Squaw Creek NWR) field trips and possibly one weekend field trip (optional). If a local field trip is within 50 miles, I will ask students to carpool and drive their own vehicles. I am sorry, but this is a new Biology Department policy. Please do not miss a lab; missing labs will cause your grade to drop (see attendance policy). Most laboratory exercises will require writing a laboratory report. In addition to your lab text, please bring a calculator and the lab notebook to the laboratory.

Article Reviews/Essay: In response to growing criticism that today’s college students have poor writing skills and that science students have not been adequately exposed to current research, I want you to read the current literature. You will review an ecological article from the primary literature. Details of this assignment will be given in class.

Grading: Your grade will be calculated as a percentage of the total possible points earned on each assignment and will be based on examinations, laboratory reports, and article reviews and/or essays. I do not grade on attendance in the lecture, but it can affect your grade indirectly. Attendance in lab is required. While this is not an English course, the ability to communicate clearly is a necessity for all areas of study. Therefore, your spelling and grammar will be taken into account on all exams and writing assignments. Your grade will be partitioned as follows (subject to change):
- 4 lecture exams 65%
- laboratory exercises and reports 25%
- article reviews/essays 5%
- quizzes 5%

A = 90-100%, B = 80-89%, C = 70-79%, D = 60-69%, F = below 60%
**Attendance:** All students at Missouri Western State University are expected to attend all classes and class activities for which they have enrolled. I do not give make-up exams except for excused absences (e.g. sporting events) or severe illness or injury. If you plan to miss an exam because of a college-approved excused absence, you must make arrangements to take the exam before your absence.

If you miss an exam because of a death in your family or a severe illness or injury, you must provide a written statement from a doctor or other professional indicating the nature of the problem, and you must take the exam within two working days of your return. Once I have returned the exams, you cannot make it up. If you miss an exam for any other reason, you will receive a zero for that exam.

You must attend all laboratory sessions; that is, these labs cannot be made up. **If you miss more than three labs, you will receive an F for the course.** You will receive a reduced grade for late laboratory reports and work received more than 5 days late will not be accepted.

**MWSU Policy Descriptions for Syllabi**

**Fall 2015**

**Biology Department Classroom Professionalism Policy:** While in lecture or laboratory class meetings, students are expected to act in a professional, courteous, and respectful manner in order to maintain a productive learning environment for all. The use of any personal electronic devices (cellular phones, PDAs, MP3 music players, etc.) during class time is not permitted, except for an emergency or as part of a class activity. Please turn all such devices off upon entering the classroom or laboratory. Unauthorized use of personal electronic devices during a class meeting may, at the discretion of the instructor, result in dismissal from class loss of any grading points for that meeting.

**Biology Department Late Instructor Policy:** In the rare event that the instructor is more than 10 minutes late for this class please do not leave the class, but notify the Biology Department office right away. It is the policy of the Biology Department to implement a contingency plan so that class will not be canceled.

**Academic Honesty Policy for BIO 225**

It is expected that all students will submit their own work in this course. In cases of plagiarism or dishonesty during exams, quizzes, or other assignments, the student will receive a "0" (F) on that activity. Subsequent infractions may result in removal from the course or university. Please read the MWSU Catalog and Student Handbook for additional policies.

**MWSU Academic Honesty Policy and Due Process:** Academic honesty is required in all academic endeavors. Violations of academic honesty include any instance of plagiarism, cheating, seeking credit for another’s work, falsifying documents or academic records, or any other fraudulent activity. Violations of academic honesty may result in a failing grade on the assignment, failure in the course, or expulsion from the University. When a student’s grade has been affected, violations of academic honesty will be reported to the Provost or designated representative on the Academic Honesty Violation Report forms.

Please see the Student Handbook and Calendar for specific activities identified as violations of this policy and the student due process procedure (see page 36 of the Student Handbook, found at [http://griff.vn/handbook](http://griff.vn/handbook))

**MWSU Grade Appeal Policies:** Students are responsible for meeting the standards for academic performance established for this course by the instructor. The grade appeal procedure is available for the review of allegedly capricious grading or clerical error by the instructor and not for the purpose
of evaluating the student’s academic excellence in any particular course. Capricious grading is defined as:

- the assignment of a grade to a particular student on some basis other than the performance in the course;
- the assignment of a grade to a particular student by resorting to more exacting or demanding standards than were applied to other students in the course;
- the assignment of a grade by a substantial departure from the instructor’s previously announced standards.

The Grade Appeal Policy is described on page 40 of the Student Handbook, found at http://griff.vn/handbook; the Biology Department grade appeal process can be found at: https://www.missouriwestern.edu/biology/policies/.

**Students with Disabilities:** Disability Accommodations - Students seeking accommodations must first provide documentation of needed accommodations to the Accessibility Resource Center (ARC) located in Eder Hall, Suite 203. Once accommodations have been approved by the ARC, students are responsible for notifying their instructors of those accommodations. This should be done within the first two weeks of classes. Accommodations are not retroactive.

Mike Ritter, Accessibility Resource Center Coordinator
(816) 271-4330
mritter@missouriwestern.edu

**A Note on Harassment, Discrimination and Sexual Misconduct:** Consistent with its mission, Missouri Western seeks to assure all community members learn and work in a welcoming and inclusive environment. Title VII, Title IX and University policy prohibit harassment, discrimination and sexual misconduct. Missouri Western encourages anyone experiencing harassment, discrimination or sexual misconduct to talk to someone from the Campus and Local Resources list found in the Student Handbook (https://www.missouriwestern.edu/studentaffairs/wp.../handbook.pdf) about what happened so they can get the support they need and Missouri Western can respond appropriately.

There are both confidential and non-confidential resources and reporting options available to you. Missouri Western is legally obligated to respond to reports of sexual misconduct, and therefore we cannot guarantee the confidentiality of a report, unless made to a confidential resource. Responses may vary from support services to formal investigations. As a faculty member, I am required to report incidents of sexual misconduct and thus cannot guarantee confidentiality. I must provide our Title IX coordinator with relevant details such as the names of those involved in the incident. For more information about policies and resources or reporting options, please visit the following website: https://www.missouriwestern.edu/titleix/sexual-misconduct-policy/

Students have received information via email regarding training regarding Title IX. Student employees may have additional required training. Please follow the link in the email sent to your MWSU student account to complete the training. Students who do not complete the training will receive a hold on their account, prohibiting future semester enrollment until the training is complete. These training courses will ensure that all students are appropriately educated about these important regulations.

**MWSU Classroom Recording Policy:** It is important for Missouri Western State University to foster and maintain an educational environment that promotes free discussion, inquiry and expression by students, both inside the course and out, without fear that their exercise of such rights will have negative repercussions in areas over which Missouri Western State University has responsibility. It is equally important that students understand the narrow line separating their First Amendment rights
and the legal and privacy rights of others so that students can exercise those rights with responsibility.

The content of any lecture/class presentation remains the intellectual property of the person delivering the session. Students may make audio or video recordings of course activity only with permission of the faculty member conducting the course. If the student believes it is necessary to record sessions due to a disability or needs additional assistance, the student must first contact Missouri Western’s Accessibility Resource Center to establish such need. By virtue of this policy, all students and attendees in any classroom setting or university presentation are placed on notice that they may be recorded or taped, both photographically or audio based.

Any and all recordings of lectures or class presentations are authorized solely for the purpose of the student’s individual or group study with other students enrolled in the same class. Such recordings may not be reproduced or uploaded to publically accessible web environments. Recordings of classes or course material may not be exchanged or distributed for commercial purposes, for compensation or for any other purpose other than study by students enrolled in the present class. Students must delete all recordings and tapes at the end of the course.

Please note that materials used in the classroom or online presentations (video, graphic, photographic, etc.), web-based and social media may also have their own copyright. While presentations and displays are generally allowed when reproduced in the classroom, copyright law does not extend the privilege to second-level reproductions. Any violation of this policy may subject a student to disciplinary action under the Student Code of Conduct as outlined in the Student Handbook and will result in disciplinary action by the University and/or punishment under Federal or State Privacy, Intellectual Property or Copyright Law.

Class Disruptions:
- **Tardiness**: You must arrive on time to all class meetings. It is disruptive and disrespectful to habitually arrive 5, 10, 15 or even 20 minutes late for class.
- **Cell phones and other electronic devices**: Please turn off or set to vibrate all cell phones, smart phones, tablets, etc. If your cell phone rings, I will probably answer it for you. If it happens a second time, I will confiscate the cell phone and you will need to see the Department Chair or Academic Dean to recover it.
- **MP3 (iPod) players**: Please do not sit in class with headphones on. If you wish to listen to music rather than my lecture, please leave the classroom. You may not use these or any other electronic devices during an examination.
TENTATIVE LECTURE SCHEDULE (Subject to change):
We are using a new textbook this semester; therefore this schedule will likely change. Whereas the specific material and chapters covered are subject to change, the exam dates have been set. Exam 4 will be on the final exam day. By consensus, we could move an exam, but this would require 100% agreement among all enrolled students. In terms of material, I need to expose you to Evolutionary Theory and at least four areas of ecology: Autecology, Population Ecology, Community Ecology, and Ecosystems Ecology. It is not possible to cover all 20 chapters in 14 weeks; therefore, I will not cover all of the various topics listed below to the same degree or level (and depending on time, some not at all). Lecture Exams will be held during the lab to allow for extra time.

<table>
<thead>
<tr>
<th>Week (Monday)</th>
<th>Topic</th>
<th>Chapters</th>
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<tbody>
<tr>
<td>Week 1 (Aug. 31)</td>
<td>Introduction, Evolution</td>
<td>1-2</td>
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<td>NO Class Monday, Sept. 7 – Labor Day</td>
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<tr>
<td>Week 2 (Sept. 7)</td>
<td>Evolutionary Ecology</td>
<td>2, 7*; 18</td>
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<td>Week 3 (Sept. 14)</td>
<td>Evolutionary Ecology, Life Histories</td>
<td>2-7*; 10</td>
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<td>Week 4 (Sept. 21)</td>
<td>Climate, Physical Environment</td>
<td>3-5*</td>
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<td>EXAM 1 – Tues., Sept. 22</td>
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<td>Week 5 (Sept. 28)</td>
<td>Life History, Behavioral Ecology, etc.</td>
<td>6, 7, 10</td>
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<td>Week 6 (Oct. 5)</td>
<td>Population Ecology</td>
<td>8-10</td>
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<tr>
<td>Week 7 (Oct. 12)</td>
<td>Population Ecology</td>
<td>8-10</td>
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<td>Week 8 (Oct. 19)</td>
<td>Competition</td>
<td>11</td>
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<td>EXAM 2 – Tues., Oct. 20</td>
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<td>Week 9 (Oct. 26)</td>
<td>Coevolution (Predation &amp; Symbiosis)</td>
<td>12</td>
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<td>Week 10 (Nov. 2)</td>
<td>Community Ecology</td>
<td>13</td>
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<td>Nov. 6 LAST DAY TO WITHDRAW</td>
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<td>Week 11 (Nov. 9)</td>
<td>Succession</td>
<td>14</td>
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<td>EXAM 3 – Tues., Nov. 10</td>
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<td>Week 12 (Nov. 16)</td>
<td>Species Diversity</td>
<td>15</td>
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<td>NO Class Nov. 23-27 Thanksgiving Break</td>
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<tr>
<td>Week 13 (Nov. 30)</td>
<td>Energy &amp; Nutrient Flow</td>
<td>16-17</td>
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<td>Week 14 (Dec. 7)</td>
<td>Conservation (Selected Topics)</td>
<td>18-20</td>
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<td>Last Day of class, Friday, Dec. 11</td>
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<tr>
<td>EXAM 4 &amp; FINAL</td>
<td>Monday, Dec. 14, 8:30-10:20 AM</td>
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*We will cover selected material from Chapters 3-5 throughout the course, including in lab.

1In addition to reading from your textbook, we will read at least one article from the primary literature for each exam (or four articles total). We will discuss these articles in class and/or lab and I will attempt to use them as examples to illustrate points or concepts I am covering in the lectures. You will be responsible for materials in these articles just as you would for material in the textbook.
RESOURCES and BIBLIOGRAPHY:
Our library has a substantial number of ecological books ranging from theoretical to applied. We also have a variety of journals that contain ecologically oriented research (see list below). In addition, I have a personal library that you are welcome to use. It contains numerous books on a variety of ecological topics and five herpetological journals that contain articles on ecology.

Some of the following books (not a complete list) can be found in our library:

INTERNET RESOURCES:
The internet is a powerful tool in ecology, but it is not a substitute for good ecological literature. Use it as a starting point.
http://global.oup.com/us/companion.websites/9780199757459/ - This is the textbook’s web site.
http://esa.org - This is The Ecological Society of America’s home page.

JOURNALS: Ecology and ecologically related articles (some only available electronically)
American Journal of Botany
American Midland Naturalist
Annual Review of Ecology, Evolution, and Systematics (in stacks on 2nd floor)
Behavioral Ecology
BioScience
Canadian Journal of Zoology
Conservation Biology
Copeia
Ecology
Ecological Monographs
Evolution
Fisheries Management and Ecology
Freshwater Biology
Herpetologica
Journal of Herpetology
Journal of Mammalogy
Journal of Wildlife Management
Natural Areas Journal
The Wilson Journal of Ornithology
Wetlands Ecology and Management

Updated 30 August 2015
GENERAL COMMENTS:

Ecology is an inherently quantitative field of science. That is, in order to study and explain the distributions and abundance of organisms, you must use math and statistics. I will assume that you have had a course in College Algebra or more advanced mathematics. I will cover some basic concepts of statistics in lab; however, I will assume you remember statistical concepts that were covered in BIO 105, Principles of Organismal Biology, the prerequisite for this course. Whereas your textbooks are filled with equations, I will not dwell on the mathematical side of ecology, but I will require you to understand the basic meaning behind the equations.

Ecology is a conceptual as well as applied field of science. My goal is to help you to bring together many ideas and concepts that you have already been exposed to with new ones in order to synthesize coherent ideas and theories that allow us to better understand the natural world. In other words, I will require you to think; to go beyond mere memorization of facts and to use your knowledge to understand and solve ecological problems. I hope by the end of this course you will be thinking like an ecologist. I hope to give you the necessary tools to solve ecological problems. In order to do this, I will not always give you all the answers or necessary information. The first part of many of our labs will consist of first identifying how we will go about solving the problem and not me instructing you on exactly what we will be doing in lab that day.

This is a college-level Biology course. As such, I will expect you to perform at this level. I realize that many of you do not have the same academic background, but I cannot go back and teach you the basic concepts of Biology during the regular lecture hour. If you feel that you are falling behind, please come to see me so that I can get you “up to speed” on a one-on-one basis. For example, if you are weak in an area that we are discussing, let me help you to get up to the level of the rest of the class. But you must do this on your own initiative. I will not baby-sit you! After the exam is usually too late!

I expect you to read your book. This sounds like a silly thing to tell college students, but it has been my experience over the years that many students do not read the textbook and some do not even buy it! I cannot cover all of ecology in 14 weeks. I will refer you to tables and figures in your text and will sometimes have you read sections that I do not have the time to cover. This means that you must buy the book! The laboratory manual is a great tool and reference book. If you plan to become a field biologist or enter a graduate program, you will want to hang onto this book. I still have mine and use it regularly.

I am excited about ecology. If you come into this course with curiosity and high expectations, you too will be excited about ecology!

I reserve the right to make changes to this syllabus. Any changes will be announced in class and/or via email. –Dr. Mills

Updated 30 August 2015