

NAT_R 8001: Design of Ecological Experiments

Fall 2018

Instructor:

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Course Information:

2 credit hours
Day and time: Tuesday, 9-11am
Room: 322 Tucker Hall
Office hours: by appointment

Course Objectives:

The intent of this course is to teach beginning graduate students the principles of experimental design in the context of conservation, ecological, behavioral, and evolutionary research. My goal is to effectively integrate the processes of developing research questions and hypotheses with the physical layout of experiments and the assumptions of inferential statistics.

Prerequisites:

This class assumes previous course work or experience with general statistics or biometry.

Course Description:

The framework of the course will primarily be a combination of discussion and lecture. Discussions and lectures will center on primary and review papers from the current literature and book chapters. As the course is also meant to be practical, there will be an opportunity to help design or bolster thesis/dissertation research through a short written and/or oral research proposal. Additionally, there will be a few homework problems related to typical problems faced when designing experiments. I require that all students participating in this course have at least a basic statistics course, and suggest at least one course in ecology, behavior, or field biology. Emphasis will be placed on analysis of variance designs but also will include some discussion of alternatives such as multiple regression, AIC model selection, and mixed models.

Grading:

Based on participation in discussions and homework activities, sharing ideas and experiences, leading of assigned literature, and a written research proposal and presentation. Due to the interactive nature of this course, if you have more than three unexcused absences, you cannot pass the class. If you anticipate missing extensive class for field work, professional meetings, or other scholarly activity, contact me as soon as possible.

Readings:

The class readings will consist of articles from the primary literature or book chapters in Community Ecology edited by Ted Case and Jared Diamond (1986), Experimental Ecology edited by William Resetarits and Joseph Benardo (1998), and/or Design and Analysis of

Ecological Experiments by Samuel Scheiner and Jessica Gurevitch (2001). No textbook will be required to be purchased; all book chapters will be provided.

Schedule of Topics (subject to change, based on class interests):

- A. An experimental approach in conservation , ecology , behavior , and evolution
 - development of questions: taking an inferential approach
 - formulation of testable hypotheses
 - realism versus generality; field versus lab
 - setting the scale of experiments
 - costs and benefits of laboratory, field, and natural experiments
 - trade-offs in designs
- B . Experimental procedures
 - defining experimental units at different scales
 - defining the 'minimum' experiment
 - preventing pseudo-replication through independence and dispersion
 - true randomization
 - benefits of temporal and spatial blocking

ADA/Equal Access Policy:

The University has instituted a procedure for handling accommodation requests for students with disabilities for access to instructional programs. Under the Americans with Disabilities Act, the University must provide a reasonable accommodation requested by a student to insure access to instructional programs, unless it would present an undue hardship to the College.

Students with disabilities:

Please let me know as soon as possible if:

- You anticipate barriers related to the format or requirements of this course.
- You have emergency medical information to share with me.
- You need to make arrangements in case the building must be evacuated.

If you require disability-related accommodations (such as a notetaker, extended time on exams or captioning), please establish an Accommodation Plan with the Disability Center:

disabilitycenter@missouri.edu
S5 Memorial Union
573-882-4696

After you have registered, please notify me of your eligibility for reasonable accommodations. For other MU resources for students with disabilities, click on "Disability Resources" on the MU homepage.

Academic Dishonesty:

Academic integrity is fundamental to the activities and principles of a university. All members of the academic community must be confident that each person's work has been responsibly and honorably acquired, developed, and presented. Any effort to gain an advantage not given to all students is dishonest whether or not the effort is successful. The academic community regards breaches of the academic integrity rules as extremely serious matters. Sanctions for such a breach may include academic sanctions from the instructor, including failing the course for any

violation, to disciplinary sanctions ranging from probation to expulsion. When in doubt about plagiarism, paraphrasing, quoting, collaboration, or any other form of cheating, consult the course instructor.

Intellectual Pluralism:

The University community welcomes intellectual diversity and respects student rights. Students who have questions or concerns regarding the atmosphere in this class (including respect for diverse opinions) may contact the departmental chair or divisional director; the director of the [Office of Students Rights and Responsibilities](#); the [MU Equity Office](#), or equity@missouri.edu.

All students will have the opportunity to submit an anonymous evaluation of the instructor(s) at the end of the course.