

FW 551 - Design of Fish and Wildlife Studies - Fall 2016 - CSUOnline

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Office hrs: Office hrs. can be arranged on an individual basis

Credits: 3 graduate-level credits awarded

Prerequisite: One statistics or biostatistics course (300 level or higher or 200 level from community college) **OR** permission of instructor (e.g. professional work experience with statistics and design).

Method of Delivery: CSU Online; course materials/lectures on CANVAS; email.

Course Description:

CONTENT: FW 551 provides a non-mathematical introduction to the design of research studies used in fish, wildlife, and conservation biology. Fundamental concepts about sampling studies, controlled experiments, quasi-experiments, monitoring studies, observational studies, and the associated philosophies of science will be covered. This course will not delve into the analyses of data, e.g., ANOVA, general linear models, etc. Rather, emphasis will be on issues related to valid study design, types of designs to choose from and their benefits/shortcomings, and inference that can be gained from different design levels/types. In wildlife, as in all of the sciences, what we can “claim to know” is determined by the sampling protocol and study design. Sloppy or inappropriate study design can hamper or reverse scientific progress whereas insightful and creative approaches greatly advance our understanding of the natural sciences. Students that successfully complete the course will be able to: 1. critically evaluate sampling protocols, 2. determine if a study design was appropriate for addressing a scientific hypothesis, 3. know when to use and how to apply different experimental designs, 4. identify the statistical inference that can be made from a study, and 5. critically evaluate conclusions from studies in the scientific literature.

ONLINE FORMAT: the format of this online version of FW551 is built to accommodate professionals in wildlife agencies and careers, and also graduate students who are off campus or in the field. Materials will be organized by week and released at the beginning of each week for students to complete during timeframes that meet their unique schedules. There are no specific meeting/discussion times or oncampus meetings – all activities can be done electronically at your own pace within the “weekly windows”. Testing is also done by arranging a start and end time

with your instructor within the “weekly window” for each exam. Testing is typically a timed open notes format, or written open notes take home.

Readings:

TEXT BOOK: Morrison, M.L., Block, W.M., Strickland, M.D., Collier, B.A., Peterson, M.J. 2008. Wildlife Study Design, 2nd Edition. Springer.

- An online version of the text is available through the CSU Library at <http://discovery.library.colostate.edu/Search/Home?lookfor=wildlife%20design&type=all> or you can buy a cheap print copy through the same site.

PAPERS: select readings will be posted weekly on the Canvas site.

- Students will be asked to post discussions on the papers, take short quizzes on the readings, or turn in formal evaluations. Additional readings not included in this syllabus may be substituted or assigned.

Grading: The total points for the different methods of assessment are approximately:

- Participation (Quizzes, Discussion posts, etc.): 20%
- Assignments (paper evaluations, etc.): 25%
- Midterm Exam (open book, timed): 20%
- Final Exam (open book timed & take home): 35%

As a guide, a student can expect the following grade if your overall percentage scores are as follows:

“A” 90% or higher; “B” 80 - 89%; “C” 70 - 79%; “D” 60 - 69%; “F” 59% or lower

I reserve the right to award + and - scores for borderline cases.

Academic Integrity:

Academic integrity is taken seriously at CSU and I expect all students to adhere to campus policies. The CSU policy is available in the General Catalog, <http://www.ssw.chhs.colostate.edu/field/files/Field%20Manuals/Policies/CSU%20Policy%20on%20Academic%20Dishonesty.pdf>

Plagiarism is just one aspect of academic integrity but with so much easily accessible information available on the internet, it is an area where it is easy to violate the policies. Because of this, I want everyone to know what we mean by plagiarism. From the CSU General Catalog: “Plagiarism includes the copying of language, structure, ideas, or thoughts of another, and representing them as one’s own without proper acknowledgment. Examples include a submission

of purchased research papers as one's own work; paraphrasing and/or quoting material without properly documenting the source."

If you plagiarize in your work you could lose credit for the plagiarized work, fail the assignment, or fail the course. Plagiarism could result in expulsion from the university. Each instance of plagiarism, classroom cheating, and other types of academic dishonesty will be addressed according to principles published in the CSU General Catalog (see Procedures for Dealing with Academic Misconduct).

For more information about plagiarism, I suggest you read [The Council of Writing Program Administrators Statement on Plagiarism](#).

Academic integrity means more than just avoiding plagiarism. It also involves doing your own reading and studying. It includes careful consideration of all class materials, and engagement with the class and your fellow students. Academic integrity lies at the core of our common goal: to create an intellectually honest and rigorous community. You may be asked to write and sign the following statement on major assignments, papers, and exams: "I have not given, received, or used any unauthorized assistance." This statement is one of the CSU HONOR PLEDGES.

FW 551 ONLINE FALL 2016 (prepared 15 August 2016, subject to change)

WEEK	LECTURE TOPIC	READINGS	ASSIGNMENTS
1	Introduction and The Tea Experiment	Fisher (1971) Romesburg (1981) Chamberlain (1965) Platt (1964)	Introduction, Pre-class quiz See Syllabus on Canvas for due dates
2	Ideal Experiment THEN Principle Terminology	TEXT Ch. 1.1-1.2, & 1.5 TEXT: Ch. 2.1-2.6. Popper (1957)	Induction, Deduction, Retroduction Assignment Scientific method Discussion
3	Sampling Designs: validity, experimental unit, experimental error	TEXT Ch. 4.1-4.3 Romesburg (1991) O'Conner (2000)	Post brief comments on the 2 readings on Canvas
4	Variance Reduction: Bias in Experimental Design	TEXT Ch. 3.1-3.5 Joiner (1981)	Lurking variable Discussion

5	Statistical/Scientific hypotheses and Experimental Design Basics	TEXT Ch. 3.1-3.5 Joan Fisher-Box (1980)	Discussion of randomization
6	Advanced Experimental Design	TEXT Ch. 3.6-3.11	Evaluation of Bohannon et al. paper
7	Modeling and Models	No assigned reading except for assignment	Evaluation of Gessaman and Nagy (1988) paper
8	MID-TERM EXAM		Timed, take home exam
9	Non-experimental approaches to gaining knowledge and Multivariate Statistics	Eberhardt and Thomas 1991	
10	Repeatability and reliable knowledge	Nosek et al 2015 Lindsay 2015	
11	Meta analysis what is it and how does it advance knowledge?		
12	Hypothesis Testing, Model Selection	Anderson et al. (2000) Anderson et al. (2001) Burnham and Anderson (1992, 1998) Fagerstrom (1987)	Hypothesis testing investigation (includes addn'l readings)

13	Environmental impact monitoring	TEXT Ch. 6.1-6.9 Stewart-Oaten et al. (1986) Underwood (1994) Hurlbert (1984) Carpenter (1990) Skalski (1990) Hargrove & Pickering (1992)	Discussion of Experiments in Landscape Ecology
	FALL BREAK – ENJOY!	n/a	n/a
14	Inventory and Monitoring	TEXT: Ch. 7.1-7.7	
15	Adaptive Management	Text Ch. 7.8 Walters and Holling 1990 Kendall 2001	Evaluate your own research
16	WINDOW of TIME for FINAL EXAM	FINAL EXAM INSTRUCTIONS will be posted on Canvas. There will be a timed open-note online test and a take-home portion.	

* NOTE: Lecture videos, readings and quizzes will be posted via Canvas. Readings subject to change as new material is available.