ESS 350 – Field Research Methods
Syllabus and Schedule Fall Semester 2019

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Office hours: T 9-9:50 am; W and F 11 am – 12 pm; open door policy, or by appointment

Pre-requisites: Permission

Meeting Place and Time: Brumbaugh Academic Center B205 T 10-11:20 am and F 1:30 – 4:50 PM

Communications: Please use your Juniata email or have it forwarded automatically to your preferred email address.

Withdraw Deadline: You may withdraw up to the last day of classes

Texts: None required

Suggested Texts:

1. Murphy, B. R., and D. W. Willis, Editors. 1996. Fisheries techniques. Second edition, American Fisheries Society, Bethesda, MD. ISBN 1-888569-00-X, **OR**
2. Zale, A. V., D. L. Parrish, and T. M. Sutton, Editors. 2013. Fisheries techniques. Third edition, American Fisheries Society, Bethesda, MD. ISBN: 978-1-934874-29-5, and
3. Any field guide(s) or plant manuals applicable to our region.
4. Hubert, W. A., and M. C. Quist, editors. 2010. Inland fisheries management in North America 3rd edition. American Fisheries Society, Bethesda, Maryland.
5. Braun, C. E., Editor. 2005. Techniques for wildlife investigations and management. Sixth edition, The Wildlife Society, Bethesda, MD. ISBN 0-933564-15-5, **OR** both the following:
6. Silvy, N. J., editor. 2012. The wildlife techniques manual: research. 7th edition. The John Hopkins University Press, Baltimore.
7. Silvy, N. J., editor. 2012. The wildlife techniques manual: management. 7th edition. The John Hopkins University Press, Baltimore.
8. Pechenik, Jan A. 2013. A short guide to writing about biology. 8th edition. Pearson, Boston, MA.
9. Crawley, M. J. 2005 (pdf) or 2015. Statistics: An introduction using R. John Wiley and Sons Ltd., **OR**
10. Dalgaard, P. 2008. Introductory statistics with R. Springer, New York. (free pdf from Springer)

Additional readings will be handed out in class or otherwise assigned.

Expected Learning Outcomes:
During and upon completion of this course, students will:

- practice safety and humane treatment for living things during ecological investigations;
- improve and demonstrate understanding of field-based study design and statistical techniques;
- correctly explain and employ various mechanical and analytical techniques to sample and quantify individuals, populations, communities, and the physical habitats of various wildlife and fish species or communities; and
- identify or determine species, age, gender, and / or diet of wildlife and fish in the field or lab, including forensic-type materials (bones, teeth, fish scales, etc.)
- demonstrate the attributes of a good field biologist

Course Philosophy and Description: Scientifically-based evaluation of fish and wildlife populations, communities, and habitats and ecosystems in which they reside is the key to successful management and conservation endeavors. Accurate evaluation requires sound scientific techniques, from study planning, through data collection and analysis phases, to the final written report. The best way to master these techniques is through hands-on activities. This course will emphasize hands-on learning and will immerse students in many techniques used in field-based ecological studies. While it is impossible to be truly comprehensive, this course will provide far ranging topics and details. Instructional methods will include lectures, discussions, in-class / lab activities, and many field activities.

Specific Course Requirements
Your grade in this course will be based on a total of 350 points received from these sources:

- Lecture exams: **Three exams** are scheduled, **including a comprehensive final exam.** Exams will consist of materials from lectures, labs, discussions, handouts, assigned readings, field trips, etc. Anything assigned or covered in class/lab is fair game. Exams will primarily be in the form of questions where students provide short answers, explanations, graphs, etc. However, true or false and fill-in-the blank type questions also are possible. If you can't take an exam at the regularly scheduled time, arrangements must be made before the scheduled exam time. There will be no make-up exams. Do not be late on exam day. Once an exam has been turned-in by a student, no more exams will be handed out. Each lecture exam is worth 100 points and the comprehensive final is worth 150 points = **Total 350 points.**

- Assignments: Students are required to complete various graded lab reports and exercises. Topics emphasize hands-on experience in, for example, vegetation and habitat assessment, fish aging, and other timely, unique topics as they arise. There will be approximately 10 lab exercises for a total of up to **300 points**, including assessment of your willingness to be involved in the activities, taking initiative to get things done and to get experience in various techniques, not crying if it is cold and wet outside, etc.

Extra Credit: Each day I may begin lecture by opening the floor for short vignettes (5 minutes) on the topic of news related to environmental science, natural resource management, and wildlife

and fisheries science. This is a great way for us all to stay current in the field. Students may bring in and discuss current newspaper or scientific journal articles. Everyone is encouraged to contribute. Extra credit will be allocated at the rate of 1-5 points per article.

Extra credit also can be obtained by assisting the DCNR, DEP, PaF&B, Game Commission, etc. with various activities as they become available (e.g., aging of deer jaws during the hunting season, bear check station attendance, fish habitat improvements, etc.). Details will be provided when appropriate. You must get a signature and statement from the person you helped and you must write up a short summary of what you did, the purpose of the work, etc. (2 pages; 10 points maximum per activity).

Attendance: Y**ou must attend classes** regularly (e.g., every time) to do well in this class. However, responsibility for class attendance rests with you. Remember that all materials covered in lectures, labs, field trips, discussions, and readings are sources of potential exam questions. Periodically, I may give short, unannounced quizzes during lecture that count as extra credit points toward your overall final grade. Quizzes CANNOT be made up if missed. You most likely will not succeed in this course unless you regularly attend. There is no experiential substitute for missing lab and field activities.

General Guidelines and Suggestions for Excelling in this Class

- Please be prepared for lecture and lab: read any assigned papers, books, etc. beforehand, dress appropriately for the anticipated field trip conditions, and come with a great desire for learning and participating.
- Please complete all assignments in the utmost professional style and format of which you can conceive. Leave no room for questioning the authenticity of your own, unique work. Sloppy and unprofessional work will not be accepted. More than 2 or 3 immediately obvious flaws that reek of carelessness, unprofessionalism, plagiarism, etc., will be immediately assigned a grade of 0 points. In other word, graders have the authority to make judgment calls on whether or not submitted work is acceptable quality representative of a completed learning activity.
- Please turn in assignments on time on the due date at the beginning of each class. Please make arrangements to complete any needed work before you arrive on the day an assignment is due.
- All assignments and lab reports (i.e., anything that is due) must be turned into the official…

“ Assignment Box ”

…on the due date. Late assignments cannot be accepted. Please manage your activities appropriately so assignments are turned in on time and in a professional manner. Your work will be viewed very kindly by your colleagues if you present it in the highest possible quality. Only in extreme emergencies will work be accepted late, so please plan accordingly.

Missed Exam Policy: Students that have excused absences from any exams will have the opportunity to make them up within a week of the original offering. Only absences excused for health or emergency reasons will be accepted. Being snowed in at a ski resort doesn't count. Plan appropriately leading into an exam.

GRADING: Grades are based on the percentage of total points earned.

A	93-100	B-	80-82	D+	67-69
A-	90-92	C+	77-79	D	63-66
B+	87-89	C	73-76	D-	60-62
B	83-86	C-	70-72	F	<60

Comment about borderline grades: Final grades are final. No arbitrary rounding of grades to the next higher letter-grade category will occur. If you think you will be on the borderline to the next higher grade category, then take advantage of the extra credit opportunities now, and show your dedication etc. via participation so you earn all your participation and attendance points. Don't beg for "bumping" your grade up after the semester ends.

Disability Accommodations: Juniata College is committed to providing equitable access for learning opportunities to students with documented disabilities (e.g. mental health, attentional, learning, chronic health, sensory, or physical) under the American Disabilities Act. To ensure access to this class, please contact **Patty Klug, Coordinator of Disability Services**, at klugp@juniata.edu or at 814-641-5840 to engage in a confidential conversation about the process for requesting reasonable accommodations in the classroom. Accommodations are not provided retroactively, so students are encouraged to register with the Disability Services preferably by the start of the semester and before the Drop/Add period; however, requests can be made at any time. Note that students must obtain a new letter of reasonable accommodation for every semester and must meet with each faculty member prior to implementation in each class. Students are strongly encouraged to deliver letters of reasonable accommodation during faculty office hours or by appointment.

Juniata College encourages students to access all resources available through Academic Support in the office of QUEST for consistent support and access to their classes. More information can be found online at Juniata.edu under Academic Support Services and "Disability Services," or by contacting the office at 814-641-3160.

Academic Integrity Policy: Academic dishonesty (i.e., cheating on exams, plagiarism) will not be tolerated. All members of the Juniata College community share responsibility for establishing and maintaining appropriate standards of academic honesty and integrity. Students oblige themselves to follow these standards and to encourage others to do so. Faculty members also have an obligation to comply with the principles and procedures of academic honesty and integrity as listed here through personal example and the learning environment they create.
One of the strongest traditions in higher education is the value the community places upon academic honesty. Academic integrity is an assumption that learning is taken seriously by students and that the academic work that students do to be evaluated is a direct result of the commitment of the student toward learning as well as the personal knowledge gained. Academic dishonesty, therefore, is an attempt by a student to present knowledge in any aspect as personal when in fact it is knowledge gained by others. The associated penalty will be based on the nature and seriousness of the offense, ranging from an official warning, a reduced or failing grade for the assignment, to a reduced or failing grade for the course.

Fall 2019 Tentative Schedule*

Date	Topic	Reading and Assignments
Aug 30	Lec and Lab 1: Introduction to course, care and handling of organisms/safety; introduction to IACUC; water and watercraft safety; electrofishing safety	Syllabus; FT Ch. 1, 5; WT Ch 7, WT2 Ch 3, handouts Assignment 1: Video guide
Sep 3	Lec 2: Fisheries sampling	FT Ch. 6, 7, 8
6	Lab 2: Reservoir fisheries sampling; marking and tagging techniques; diet sampling	FT Ch. 11 Assign 2: Sample collection: diet, otoliths, pictures of marking fish
10	Lec 3: Fisheries sampling	FT Ch. 6, 7, 8
13	Lab 3: Reservoir fisheries sampling; diet sampling techniques	Assign 3: Sample collection: diet, fish scales
17	Lec 4: Stream invertebrate sampling	FT Ch. 10, WT2 Ch. 14
20	Lab 4: Field sampling benthic invertebrates	Assign 4: Sample collection
24	Lec 5: Aquatic vegetation ecology and management	FT Ch. 4, 10; WT Ch 17, 18, 20
27	Lab 5: Aquatic vegetation survey in Raystown Lake	FT Ch. 4, 10 Assign 5: Aquatic veg coverage
Oct 1	Lec 6: GM in Reno, **AFS / TWS conference**; Exam 1	
4	Lab 6: Wetland ecology, management, delineation (**Matthew Gall, USACE**)	WT Ch. 30; WT2 Ch. 28, 29 Assign 6: Wetland classification
8	Lec 7: Population estimation methods	FT Ch. 11; WT Ch. 5, 6
11	Lab 7: Sampling for population estimates (USACE rain date)	Assign 7: Population estimate
15	Lec 8: Population estimation methods	FT Ch. 11; WT Ch. 5, 6
18	Fall Break; **Susquehanna River Symposium**	
22	Lec 9: Stream flow and pollution loads	FT Ch. 4
25	Lab 9: Measuring discharge / water quality	Assignment 8: Pollution loads
29	Lec 10: Herpetofauna sampling techniques	
Nov 1	Lab 10: Herp sampling lab	Assign 9: herp density and biomass
5	Lec 11: Telemetry	WT2 Ch 10
8	Lab 11: Telemetry lab	Assignment 10: Tracking
12	Lec 12: Exam 2	
15	Lab 12: Bug ID lab	Assignment 11: Final exam practical prep, IBI calculations
19	Lec 13: Age and growth of fishes / wildlife	FT Ch. 15, WT2 Ch. 8
22	Lab 13: Age and growth analysis of fishes	Assignment 12: Fish age / growth
26	Lec 14: Age and growth of fishes / wildlife	Assign 13: Deer jaw aging analysis
29	Tgiving	
Dec 3	Lec 15: Diet sampling techniques	FT Ch. 16
6	Lab 15: Quantitative description of diet	Assignment 14: Barn owl diet stats
10	Lec 16: Catch up / review	
13	Lab 16: Lab review practical materials	
16-20	Finals week	

***All dates, times, and topics are subject to change.** This schedule will likely need some adjustments as the semester progresses; the appearance of revised editions will be announced in class.

*IFM = Hubert and Quist 2010
*FT = Zale et al. 2012
*WT = Braun 2005
*WT2 = Silvy 2012

Field Research Methods (ESS 350) Grading Worksheet (Fall 2019)

Assignment	Approx Date Due	Pts Earned	Possible Pts
Exams			
Exam 1	Oct 1		100
Exam 2	Nov 12		100
Final Exam	TBA		150
	Subtotal		**350**
Assignments		Various exercises & points as appropriate (**revisions likely**)	
Safety video	Aug 30		20
Watercraft safety (EC on your own)	Dec 8		0
Fish diet, scales sample collection	Sep 6, 13		20
Aq invert sample collection	Sep 20		10
Aquatic vegetation coverage survey	Oct 4		20
Wetland delineation and classification	Oct 11		20
Population estimation	Oct 25		50
Stream flow lab and pollution loads	Nov 1		50
Herp density and biomass	Nov 8		20
Telemetry lab: tracking	Nov 15		20
Bug ID and IBIs	Nov 22		20
Fish age, growth	Dec 6		20
Deer jaw aging	Dec 6		10
Diet analysis: barn owls	Dec 13		20
	Est Subtotal		**300**
Extra Credit (Various opportunities)	Week after event		**0**
Total			**650**