

FISH AND LIMNOLOGY
FAS 6932, Section 4843 – Spring 2011

OBJECTIVES

The primary objective of this course is to provide students with a basic understanding of fishery science. Knowledge will be gained through classroom lectures and hands-on experience with a broad array of research methods used in fishery science. Research methods will include not only field and laboratory techniques, but also the procedures and formats for data analysis and formulation of management practices for aquatic resources.

Fishery science encompasses a variety of scientific disciplines including physics, chemistry, and biology. Specific items that will be addressed in this course include: (1) structure and function of aquatic habitats, (2) limnological laboratory and field procedures, (3) fish sampling and study methods, (4) analysis and reporting of limnological and fishery data, and (5) an overview of some important Florida aquatic resource issues.

INSTRUCTORS

The course is team-taught to permit students to benefit from the diverse experience of professionals who are working with water quality and fish populations in natural systems.

Faculty: Dr. Daniel E. Canfield, Jr., Professor - Limnology
Dr. Chuck Cichra, Professor – Fish Ecology and Management

UF/IFAS, SFRC - Fisheries and Aquatic Sciences
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Teaching Assistant: Dana Bigham (352) 273-3653 dlbigham@ufl.edu
Office at Fisheries (see 'faculty information' above for details)

Office Hours: The teaching assistant (TA) is available for help by appointment, before and after classes, and by phone and e-mail. Students encountering difficulties with course material or seeking additional information are encouraged to contact the teaching assistant. If the TA can not resolve the issue or provide the required information, students shall then schedule an appointment with the appropriate faculty member. Remember that faculty have responsibilities in addition to this course; therefore, schedule appointments in advance of when you need the information. **Feel free to talk to us before or after class periods. Also, feel free to contact us by phone or e-mail.**

COURSE WEBSITE (This link will likely change this semester as the FAS and SFRC websites merge)

<http://fishweb.ifas.ufl.edu/CourseMaterials/Cichra%20Class/CichraCourse.htm>

SCHEDULE

Lecture: 5th period (11:45 AM to 12:35 PM) on Tuesday and Thursday (3096 McCarty B).

Laboratory: 6-9th periods (12:50 PM to 4:55 PM) on Thursday at Lake Alice; 3096 McCarty B; Room 23 Bldg. 544 (Fisheries); or other designated locations. (Beginning time may be later depending on location of lab)

REFERENCE TEXTS (There are **no required books** for this course)

Hoyer, M. V., and D. E. Canfield, Jr. 1994. Handbook of Common Freshwater Fish in Florida Lakes. Special Publication 160. University of Florida, Florida Cooperative Extension Service, Gainesville, Florida.

Seaman, W. (ed.) 1985. Florida Aquatic Habitat and Fishery Resources. Florida Chapter of the American Fisheries Society, Gainesville, Florida.

Murphy, B. R., and D. W. Willis 1996. Fisheries Techniques. American Fisheries Society, Bethesda, Maryland.

Wetzel, R. G. 1975. Limnology. W. B. Saunders Company, Philadelphia, Pennsylvania.

Refer to these texts to supplement lecture and lab materials. **Numerous handouts** (journal articles, extension publications, PowerPoint presentations, and data sets) **will be given to students throughout the semester.**

GRADING (UF Grading Policies at <http://www.registrar.ufl.edu/catalog/policies/regulationgrades.html>)

First exam	15%	Oral presentation	10%
Second exam	15%	Lake Alice paper	20%
Final exam	15%	Laboratory participation	5%
Assignments	10%	Topical Review Paper	5%
		Topical Review Presentation	5%

Grades on items submitted late will be **penalized!!!!**

A: 93-100%	A-: 90-92.9%	B+: 87-89.9%	B: 83-86.9%	B-: 80-82.9%
C+: 77-79.9%	C: 73-76.9%	C-: 70-72.9%	D+: 67-69.9%	D: 63-66.9%
D-: 60-62.9%	E: < 60%			

EXAMINATIONS

The first and second in-class exams will cover only the first and second portions of the course. The final take-home exam will be cumulative. All exams will cover lecture, laboratory, and any assigned reading material. Both short answer and interpretive, essay-type questions will be asked. The TA will conduct a review session, prior to each of the first two exams, if there is interest by the students that are enrolled in the course.

LABORATORY PROJECT

A field study of the Lake Alice ecosystem will be conducted by teams of students to determine the trophic status of the lake and the current status of the fish community. Students will receive training in select field and laboratory methods and will be provided an opportunity to analyze and interpret real ecological data. Each student will then be responsible for submitting a written report that addresses a specific testable hypothesis (question) that they develop. The report should include both water chemistry and fish data collected from Lake Alice.

The Lake Alice project will include intensive field work. Each student should be prepared for active participation in each field exercise. Dress warmly for cold weather and bring rain suits when appropriate. Field sampling will not be cancelled due to inclement weather, but may be cancelled if thunderstorms are eminent. Because the laboratory will focus around work taking place on water, students are advised to bring a set of dry cloths!

Bring a small notebook for recording your personal field notes. All data should be recorded in pencil.

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Course Outline (Items may change depending upon class progress)

WEEK	LECTURE TOPICS	LABORATORY WORK
1. Jan 6	Introduction Scientific method Fishery issues	Lake Alice Overview Lab Organization Manuscript Preparation
2. Jan 11, 13	Limnology: properties of water Lake morphometry	Lake Alice (Field)
3. Jan 18, 20	Limnology: light / chemistry cycles Water chemistry	Lake Alice (Field)
4. Jan 25, 27	Sampling fishes Marking and tagging	Lake Alice (Field)
5. Feb 1, 3	Estimation of population size Fish condition factors	Lake Alice (Field)
6. Feb 8, 10	Lake eutrophication	Lake Alice (Field)
7. Feb 15, 17	EXAM I Aquatic plants and eutrophication	Lake Alice (Field) TOPICAL REVIEW DUE
8. Feb 22, 24	Aquatic plants and eutrophication Age and growth of fish	Lake Alice (Field)
9. Mar 1, 3	Empirical fisheries relationships	Data analysis lab PRESENT - TOPICAL REVIEW
10. Mar 8, 10	SPRING BREAK	No lab
11. Mar 15, 17	Fisheries-plant relationships	Lake Alice (Field)
12. Mar 22, 24	Stream eutrophication and fish	Lake Alice (Field)
13. Mar 29, 31	Fishery management	Data Analysis / Report Writing
14. Apr 5, 7	EXAM II Developing management plans	LAKE ALICE PAPER DUE
15. Apr 12, 14	Tools and strategies	LAKE ALICE ORAL PRESENTATIONS
16. Apr 19, 21	Applications, bias, and confidence Final take-home exam given out	LAKE ALICE ORAL PRESENTATIONS
17. April 26	FINAL EXAM (turn in by 1 PM) (Exams <u>can</u> be turned in <u>early</u> at Fisheries <u>or</u> at the SFRC Graduate Student Services Office, 120 NZ Hall – <u>inform</u> Dr. Cichra if you plan to turn it in early)	3096 McCarty B

Lake Alice Project Guidelines

Overview

The teaching team firmly believes that the best education in this introductory course comes about from a combination of theory and practical experience. A recent national report documented the tremendous investment that U.S. business makes annually to retrain college graduates in the more applied part of their new jobs, especially in areas ignored by college courses.

The purpose of the Lake Alice project is to give each student first-hand experience with some of the basic field, laboratory, data analysis, and presentation methods used in the aquatic sciences.

Procedures

Working as teams, students will spend nine weeks in the field, spending each lab period doing a specific task. The four primary tasks are:

- Water sampling and analysis
- Electrofishing
- Gillnetting
- Seining

Water samples will be analyzed by the students at the SFRC – Fisheries and Aquatic Sciences' chemistry laboratory immediately after the samples are collected. Round-trip transportation will be provided from Lake Alice to Fisheries and then back to Lake Alice as needed. Personal vehicles can also be used.

Fish samples will be processed (fish will be measured, weighed, marked and/or tagged), as they are collected, on the shore of Lake Alice. Students will identify (scientific name, common name, and family name) all fish that are collected.

Every student is expected to participate **actively** in the field and lab work (see course grading)! **Students must sign in at each lab period.**

Field-lab measurements and all data are to be recorded by each student team. In certain cases, you will be given a standardized data sheet. All data should be recorded in pencil.

Each team is responsible for carefully recording the data for its particular weekly task. Data from each of the four field tasks will be pooled on a weekly basis. For field fishery data, record sheets **must be given** to the Teaching Assistant/staff biologists or Dr. Cichra before leaving Lake Alice at the end of the lab. This will be the responsibility of the team captains. The water chemistry data sheets will be kept by the water chemistry lab staff. The water and fish data sheets will be consolidated, scanned, and placed onto the course website each week.

Each Wednesday, a different team will assist in the placement of sampling nets into the lake during the late afternoon (approximately 5pm – each week, the time can be adjusted somewhat to accommodate student schedules). If you are unavailable to attend due to a course or work conflict, you must inform the instructors or TA as to such during lecture on Tuesday.

Project Reporting

We are not collecting data just for the sake of collecting data. While you will gain experience as water and fish samplers, boat operators, etc., another key aspect of the project is that you will become proficient in analyzing, interpreting, and presenting the information you assemble. Data from the course are also being used to provide a long-term ecological assessment of Lake Alice. Past data, from the course, are available on the course website and in hard copy from the instructors or TA.

Note that this applies not only to the "raw data" that you collect from Lake Alice, but also to the body of literature that you are expected to review.

When you are finished, you will have (1) written a research paper in the style of a journal article and (2) orally presented your findings.

Written Report

The paper that you write will be based on the pooled data taken by all teams during the field lab project. Your task is to analyze the data and present your results as if you were preparing a manuscript for a technical journal.

The format of the paper should follow the author guidelines of the North American Journal of Fisheries Management published by the American Fisheries Society. See a recent issue or this journal or its online guide for authors' web site (http://www.fisheries.org/afs/docs/pub_najfm.pdf) for complete instructions.

Your individual paper should include:

- Title
- Author
- Abstract
- Introduction - statement of objective(s)
- Methods
- Results
- Discussion
- Acknowledgements
- References

All these sections shall be typed, double-spaced. **Two paper copies of your paper must be submitted!**

All the above sections constitute the narrative portion of your paper, and should not exceed 10 pages.

The narrative is followed by these sections:

- Tables
- Figures

Put figure captions on the same sheet as the figures. This is a variance from the standard AFS author guidelines. Be sure headings and legends are complete! Use only 8.5 x 11-inch paper.

It is essential that you review pertinent literature to compare your findings for Lake Alice with other aquatic systems in Florida.

Oral Presentation

Each student will present their project findings to the faculty and TA in a 15-minute oral presentation (10 minutes for talking and 5 minutes for questions). Details and scheduling will be announced later in the semester. PowerPoint presentation format is preferred. The TA can assist you with PowerPoint if you are unfamiliar with using this software.

Topical Review Paper

Each student will be assigned a topic pertinent to the ecology and management of Lake Alice. The student will prepare a short (3 to 5-page) written synopsis of the literature relevant to that topic. The written review paper is due on **February 17, 2011**. It will be edited and returned to the student the following week. The corrected hard copy will be provided to all other students in the class on **March 3, 2011**. Get together with the faculty or TAs to arrange to have the copies made at Fisheries. Information in the review papers will be orally presented to the other students as a short (5 to 10-minute) presentation on **March 3, 2011**.

Help

Where can you go for ideas on doing the best job?

The "Lake Alice Overview and Data Analysis" labs will review the project and presentation guidelines and provide hands-on experience with data management and analysis.

Periodic assignments will provide practice in scientific writing and in data manipulation and interpretation, according to material covered in lectures and in the handouts and reference textbooks.

Resource readings deal not only with methods, but also offer examples of how to organize and write your research paper.

Talk to the instructors and TA with your ideas and questions!

Grading

Final typed Lake Alice papers are due at the start of the lecture on **Thursday, April 7, 2011**.

Late papers will be penalized by reducing the paper grade by **10% per working day** for every day it is late.

The written Lake Alice paper is worth **25%** of the final course grade. The paper grading sheet is given on the next page of this syllabus.

Oral presentations of your Lake Alice paper will be given on **Thursday, April 14** and **Thursday, April 21, 2011**. **Students will sign up ahead of time for a specific time slot**. Only the instructors and the TA will be present at the presentations.

Participating in the labs for the Lake Alice project and all other periods is worth **10%** of the final course grade. Make sure that you sign in or have a valid excuse for missing lab.

If you are unable to meet any of the course deadlines, see the instructors (Drs. Cichra or Canfield) before the scheduled deadline date.

Student's Name: _____

The following guidelines will be used to grade the written Lake Alice papers:

Project Report Grading Sheet

For each criterion, assign a point value by circling a number:

<u>Criterion Content</u>	POINTS				
	D-	D-C	C-B	B-A	A+
Goal of study	5	7	8	9	10
Description of study site & methods	10	14	16	18	20
Presentation and analysis of project data	10	14	16	18	20
Use and citation of pertinent literature	5	7	8	9	10
Overall discussion	10	14	16	18	20
<u>Style</u>					
Readability	2	3	3	4	4
Follows AFS guidelines	5	7	8	9	10
Neatness, grammar	3	4	4	5	6

COMMENTS:

Total points: _____

Reviewer: _____

The following guidelines will be used to grade the oral Lake Alice presentation:

Name of Presenter:	
Topic:	Comments:
Overall Presentation	25
Voice	5
Clarity	5
Mannerisms	5
Professionalism	5
Flow	5
Organization (completeness of talk)	20
Introduction	2
Objective(s)	2
Method(s)	2
Data presentation	2
Conclusion(s)	2
Take Home Message	2
Logical progression	4
Presented information relevant to talk	4
Visual Aids	25
Overall appearance	10
Design/colors/fonts/cramping	3
Labels	2
Ease of understanding	5
Effectiveness	5
Time	5
Stay within limit	5
Research criteria	15
Appropriate study design	5
Proper methods	5
Appropriate statistical analyses	5
Scientific merit	10
Originality	5
Contribution to science/lake management	5
TOTAL	/100

Lake Alice Literature Suggestions

The following list identifies articles and reports relevant to Lake Alice, which were located by the class in previous years. To reduce some of your library search time, the titles are provided.

Remember, you also need to go beyond this list to locate other pertinent research articles that discuss the ecology of Florida lakes and fishes. Comparison of your Lake Alice data with that from other systems may prove useful as part of your project/paper.

- Brezonik, P. L., and E. E. Shannon. 1971. Trophic state of lakes in north central Florida. Pub. IB. Water Resources Research Center, University of Florida, Gainesville, Florida.
- Carson, J. H. 1970. Lake Alice -- A study of potential pollution of the aquifer. *Compass* 47:206-210.
- Ewel, K. C., and A. Vega. 1981. Waste water effects of a water hyacinth marsh and adjacent impoundment. *Envir. Man.* 5:537-541.
- Korhnak, L. V. 1996. Water, phosphorus, nitrogen and chloride budgets for Lake Alice, Florida, and documentation on of the effects of wastewater removal. Masters Thesis. University of Florida, Gainesville, Florida.
- Mitsch, W. J. 1975. Systems analysis of nutrient disposal in cypress wetlands and lake systems. Ph.D. Dissertation. University of Florida, Gainesville, Florida.
- Mitsch, W. J. 1976. Ecosystem modeling of water hyacinth management in Lake Alice, Florida. *Ecol. Modeling* 2:69-89.
- Mitsch, W. J. 1979. Water hyacinth (*Eichhornia crassipes*) nutrient uptake and metabolism in a north central Florida marsh. *Arch. Hydrobiologia.* 81:188-210.
- Shannon, E. E. 1970. Eutrophication-trophic state relationships in north and central Florida lakes. Ph.D. Dissertation. University of Florida, Gainesville, Florida.

Academic Honesty, Software Use, UF Counseling Services, Services for Students with Disabilities

In 1995 the UF student body enacted a new honor code and voluntarily committed itself to the highest standards of honesty and integrity. When students enroll at the university, they commit themselves to the standard drafted and enacted by students.

In adopting this honor code, the students of the University of Florida recognize that academic honesty and integrity are fundamental values of the university community. Students who enroll at the university commit to holding themselves and their peers to the high standard of honor required by the honor code. Any individual who becomes aware of a violation of the honor code is bound by honor to take corrective action. The quality of a University of Florida education is dependent upon community acceptance and enforcement of the honor code.

The Honor Pledge: We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.

On all work submitted for credit by students at the university, the following pledge is either required or implied: **“On my honor, I have neither given nor received unauthorized aid in doing this assignment.”**

The university requires all members of its community to be honest in all endeavors. A fundamental principle is that the whole process of learning and pursuit of knowledge is diminished by cheating, plagiarism and other acts of academic dishonesty. In addition, every dishonest act in the academic environment affects other students adversely, from the skewing of the grading curve to giving unfair advantage for honors or for professional or graduate school admission. Therefore, the university will take severe action against dishonest students. Similarly, measures will be taken against faculty, staff and administrators who practice dishonest or demeaning behavior.

Students should report any condition that facilitates dishonesty to the instructor, department chair, college dean, Student Honor Court, or Student Conduct and Conflict Resolution in the Dean of Students Office.

(Source: 2010-2011 Undergraduate Catalog)

It is assumed all work will be completed independently unless the assignment is defined as a group project, in writing by the instructor.

This policy will be vigorously upheld at all times in this course.

Software Use:

All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

Campus Helping Resources

Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources. The Counseling and Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

- *University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575, www.counseling.ufl.edu/cwc/*

Counseling Services

Groups and Workshops

Outreach and Consultation

Self-Help Library

Training Programs

Community Provider Database

- *Career Resource Center, First Floor JWRU, 392-1601, www.crc.ufl.edu/*

Students with Disabilities

The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues.

0001 Reid Hall, 392-8565, www.dso.ufl.edu/drc/