

**Fish and Limnology**  
**FAS 6932 - 3 Credits - Spring 2018**

**Course Overview:**

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

Fishery science encompasses a variety of scientific disciplines including physics, chemistry, and biology. By participating in this course, students will gain an understanding of:

- 1) the structure and function of aquatic habitats/systems,
- 2) limnological field sampling and laboratory processing techniques,
- 3) common fish field sampling and processing methods,
- 4) analysis and reporting of limnological and fishery data, and
- 5) many of the major issues facing Florida's aquatic resources.

**Instructors:**

This course is team-taught to provide students the opportunity to benefit from the diverse experience of professionals who are working with water quality, habitat, and fish populations in natural systems. Instructors, along with their support staff and graduate students, are located off main campus at the School of Forest Resources and Conservation, Program of Fisheries and Aquatic Sciences (7922 NW 71<sup>st</sup> Street, Gainesville, FL 32653).

Instructors:

Dr. Daniel E. Canfield, Jr. - Professor, Limnology  
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Dr. Chuck Cichra - Professor, Fish Ecology and Management  
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Marina Evans-Keene - FAS Master's Student, Limnology with Emphasis on Fish  
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**Office Hours:**

Instructors are available for help before and after class, by phone and/or email, and by appointment. Students, encountering difficulties with course material or seeking additional information, are strongly encouraged to make an appointment. We want you to succeed in our course!

**Course Website:**

This course will be supported by a UF e-learning CANVAS website located at <https://elearning.ufl.edu/>. It will include the course syllabus, PowerPoint presentations, recommended readings, handouts, course assignments, past and current lab data, presentation and paper guidelines, and other materials.

**Schedule:**

Lecture: 5<sup>th</sup> period (11:45 AM to 12:35 PM) on Tuesday and Thursday in 3194 McCarty A.

Laboratory: 6-9<sup>th</sup> period (12:50 PM to 4:55 PM) on Thursday at Lake Alice, in our classroom (3194 McCarty A), CALS computer lab (3086 McCarty B), or at other designated locations.

### Recommended Textbooks:

There are no required texts. A variety of handouts will be provided to you either as paper copies or electronically through our e-learning website. You may also find these useful:

American Fisheries Society. 2007. Analysis and Interpretation of Freshwater Fisheries Data. C.S. Guy and M.L. Brown (editors), American Fisheries Society, Bethesda, MD. 961 pp.

American Fisheries Society. 2009. Standard Methods for Sampling North American Freshwater Fishes. S.A. Bonar, W.A. Hubert, and D.W. Willis (editors), American Fisheries Society, Bethesda, MD. 335 pp.

American Fisheries Society. 2010. Inland Fisheries Management in North America. W.A. Hubert and M.C. Quist (editors), American Fisheries Society, Bethesda, MD. 736 pp.

American Fisheries Society. 2013. Fisheries Techniques. Zale, A.V., D.L. Parrish, and T.M. Sutton (editors), American Fisheries Society, Bethesda, MD. 1009 pp.

Boyd, C. E. 1979. Water Quality in Warmwater Fish Ponds. Auburn University, Alabama Agricultural Experiment Station, Auburn, AL. 359 pp. (online \$10 to \$50 – newer edition is available)

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, FL. 178 pp. (UF/IFAS Bookstore – \$7.50 – <http://ifasbooks.ifas.ufl.edu/p-162-handbook-of-common-freshwater-fish-in-florida-lakes.aspx> )

### Grading:

First Exam	15%	Lake Alice Oral Presentation	5%
Second Exam	15%	Lake Alice Research Paper	20%
Final Exam	15%	Classroom / Lab Participation	5%
Assignments	5%	Laboratory / Field Notebook	10%
		Topical Paper	5%
		Topical Paper Oral Presentation	5%

A: 94-100%	A-: 90-93.9%	B+: 87-89.9%	B: 84-86.9%	B-: 80-83.9%	C+: 77-79.9%
C: 74-76.9%	C-: 70-73.9%	D+: 67-69.9%	D: 64-66.9%	D-: 60-63.9%	E: < 60%

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

### Exams and Assignments:

The first and second exams are in-class exams consisting of a variety of short answer questions that cover only the first and second portions of the course. The final take-home exam is a cumulative essay exam. All exams will cover lecture, laboratory, and assignment materials. Review sessions may be held before the exams if students request a review prior to the exam.

There are four assignments and a lab/field notebook to be completed over the course of the semester:

- 1) *Paper Reviews* – Two past Lake Alice papers will be handed out during the first two weeks of class. You will be asked to read them prior to our first computer lab, at which time, they will be discussed. You will then provide a written review of each paper, along with completing a score sheet for each paper, using the same score sheet used to score your Lake Alice paper. These will be due one week after Computer Lab 1 (Teams 3 & 4 - **Due Feb 8<sup>th</sup>**, Teams 1 & 6 - **Due Feb 15<sup>th</sup>**, Teams 2 & 5 – **Due Feb 22<sup>nd</sup>** )

- 2) *Lake Alice Paper Topics* – You will develop and turn in two possible topics for your Lake Alice paper, including your question (testable hypothesis) and what variables/data that you plan to use for your paper. **Due March 1<sup>st</sup>**
- 3) *Lake Alice Paper Methods* – After deciding which topic you plan to address in your Lake Alice paper, you will submit the appropriate methods section for your paper. This should include both field and laboratory methods. **Due March 22<sup>th</sup>**
- 4) *Computer Lab 2* – During this lab, you will use a provided dataset to manipulate the data, perform statistical analyses, and create graphs and tables. **Due March 22<sup>nd</sup>**
- 5) *Field notebook* – Each lab, students will need to make an entry in their field notebook. Entries should include the following: date, time, weather conditions, gear information (specifications, biases, intended use, etc.), sampling methods, and any other notes related to the lab. Also, include any handouts that you are given (for example during the data and water quality labs). Each student should have a minimum of 10 entries (1 per lab). **Due April 12<sup>th</sup>**

#### **Lake Alice Research Paper and Presentation:**

Each student will submit a written research paper that includes a testable hypothesis (question) and at least one water quality parameter and one fish parameter from Lake Alice. Students must use 2018 data; however, annual data for Lake Alice are available from 1992 to present, which are on our course website. Thereafter, a 10 to 12-minute oral presentation, using Power Point or similar presentation software, will be given to the course instructors. **Paper Due April 12<sup>th</sup> Talk dates to be scheduled.**

#### **Attendance and Participation:**

Attendance is not regularly taken in the classroom. Participation is a part of your grade for the course and evaluated based on involvement in the classroom (i.e., asking and answering questions, attentiveness, involvement in discussion, etc.). Laboratory attendance is mandatory as your lab mates depend on you to be there. Please provide prior notification and/ or documentation if a laboratory must be missed. Attendance will be taken at every lab. Students are expected to show up on time at the lab and do their share of the field work.

#### **Lake Alice Laboratory:**

A field study of the Lake Alice ecosystem will be conducted by teams of students to determine the current status of the lake's water quality and fish community. Students will receive training in select field and laboratory methods and given the opportunity to analyze and interpret real ecological data.

Working in teams, students will spend much of the semester in the field, conducting a variety of specific tasks. These tasks include:

- Water sampling and analysis
- Electrofishing and processing of fish (identifying, measuring, weighing, marking, and tagging)
- Recording and analyzing data

Other activities will include:

- Discussion of course content/your reasons for taking the course
- Freshwater aquatic invertebrate identification, biology and ecology
- Aquatic plant identification, biology, and ecology
- Fish anatomy, biology, and ecology

The laboratories on Lake Alice will include intensive field work. Each student should be prepared to attend and actively participate in each field exercise. Dress warmly for cold weather, bring rain gear and a set of dry clothes. The lab will only be cancelled if thunderstorms are eminent. In addition, you will be provided with a notebook for recording your personal field notes (i.e., the methods for the given field activity, weather conditions, etc.). Bring it to each lab. All data should be recorded in pencil.

### **Topical Review Paper:**

Each student will be assigned a topic pertinent to the ecology and management of Lake Alice. Other topics can be used if approved by the instructors. 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 **Thursday – March 15<sup>th</sup>**. It will be edited and returned to the student prior to their class presentation. The corrected paper will be e-mailed to Dr. Cichra, prior to your oral presentation to the class. Information in the review papers will be orally presented to the other students in the class as a short (5 to 10-minute) presentation on **Thursday – April 5<sup>th</sup>**.

### **General Policies:**

#### Make-up Exams, Late Assignments, Missed Classes

The general policy for this course is no make-up exams or assignments will be accepted after their deadline. However, there are special circumstances that will be taken into consideration. In some cases, no loss of credit will occur. In other cases, partial credit will be lost (the amount dependent on the lateness of the assignment). Please make special arrangements by the ADD/DROP deadline if there are known conflicts. Make-up exams and late assignment submissions will be granted only in extraordinary circumstances and require official documentation, such as a doctor's note. The same guidelines apply for a missed laboratory session.

#### Academic Honesty

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment."

The Honor Code ( <http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/> ) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

#### Software

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. UF students have access to lots of free computer software, see <https://software.ufl.edu/> for details.

#### Services for Students with Disabilities

The UF Counseling and Wellness 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. Contact information for the Counseling and Wellness Center: <https://counseling.ufl.edu/>

FAS6932 Course Schedule (2018)

Order of lectures, near end of course, may change depending on guest lecture schedules

<b>Week</b>	<b>Lecture Topics</b>	<b>Laboratory – Thursdays (1:00 – 4:55pm)</b>
1. Jan 9, 11	Introduction Scientific method	Syllabus, Schedule, Lake Alice Overview Lab Organization, Teams, Rotations, Photos, Lab Methods, Notebook, Paper Guidelines
2. Jan 16, 18	Morphometry Properties of water	Lake Alice (Rotations)
3. Jan 23, 25	Geology, water chemistry Water chemistry	Lake Alice (Rotations)
4. Jan 30, Feb 1	Limiting environmental factors Nutrients, productivity	Lake Alice (Rotations) Computer Lab I – Teams 3 & 4
5. Feb 6, 8	Eutrophication / management Sampling fish	Lake Alice (Rotations) Computer Lab I – Teams 1 & 6 <b>PAPER REVIEW DUE – Teams 3 &amp; 4</b>
6. Feb 13, 15	Marking and tagging Estimating fish abundance	Lake Alice (Rotations) Computer Lab I – Teams 2 & 5 <b>PAPER REVIEW DUE – Teams 1 &amp; 6</b>
7. Feb 20, 22	Petersen estimates / assumptions <b>EXAM I</b>	Lake Alice (Rotations) <b>PAPER REVIEW DUE – Teams 2 &amp; 5</b>
8. Feb 27, Mar 1	Fish condition factors Age and growth of fish (Geoff Smith)	Computer Lab 2 – All Teams <b>LAKE ALICE PAPER TOPICS DUE</b>
9. Mar 6, 8	<b>SPRING BREAK</b>	<b><u>NO LECTURE OR LAB SESSIONS</u></b>
10. Mar 13, 15	Springs Springs	Lake Alice EF and Fish Anatomy <b>TOPICAL REVIEW PAPER DUE</b>
11. Mar 20, 22	Lakes Lakes	Lake Alice (Electrofishing / Inverts & Plants) <b>COMPUTER LAB 2 ASSIGNMENT DUE</b> <b>LAKE ALICE PAPER METHODS DUE</b>
12. Mar 27, 29	Rivers Estuaries (Amanda Croteau)	Lake Alice (Electrofishing / Inverts & Plants)
13. Apr 3, 5	Estuaries (Amanda Croteau) Fish diseases / parasites (Ruth Francis-Floyd)	Classroom - Data Analysis / Paper Writing <b>TOPICAL REVIEW PRESENTATION</b>
14. Apr 10, 12	Pond and lake management <b>EXAM II</b>	<b>LAKE ALICE PAPER AND NOTEBOOK DUE</b>
15. Apr 17, 19	Pond and lake management Fisheries Management	<b>LAKE ALICE ORAL PRESENTATIONS</b>
16. Apr 24, 26	“Silver and Gold” <b>FINAL TAKE-HOME EXAM GIVEN OUT</b>	<b>LAKE ALICE ORAL PRESENTATIONS</b>
17. May 1	<b>FINAL EXAM</b> (turn in at 1 PM) in our classroom - 3096 McCarty B. Your exam <u>can</u> also be turned in <u>early</u> at Fisheries <u>or</u> with Amy Abernethy, in the SFRC Graduate Program Office [Room 120 Newins-Ziegler Hall], or e-mailed as a PDF file to Dr. Cichra. Let Dr. Cichra know where/how you turned in your final exam.	