

**Course Prefix and Numbers:** AQFI 2462  
**Course Title:** Ichthyology  
**Semester:** Spring 2009  
**Course Schedule:** T, Th 12:30pm - 1:45pm Applied Sciences Building 105C  
Lab T 2:00pm - 4:50pm

**Instructor:** Dr. S. Lochmann  
**Office:** 230 Woodard Hall  
**Office Phone:** 575-8165  
**Office E-mail:** slochmann@uaex.edu  
**Office Fax:** 575-4637  
**Office Hours:** M, W, F 8:30am-10:30am or by appointment

**Textbook:** Fishes: An Introduction to Ichthyology. 2004 Fifth Edition. Moyle and Cech.

**Prerequisites:** General Zoology (BIOL 1460), Biology of Fishes (AQFI 2253/2153)

**Credit Hours:** 4 credit hours, including two seventy-five minute lectures (T,Th 12:30pm - 1:45pm) and one lab (Th 2:00pm - 4:50pm) per week. Laboratories are usually indoor, but one will be outdoor. The outdoor lab may require you to get wet or muddy. In every lab, you will be handling either live or preserved fish specimens. You must dress appropriately for labs.

**Course Description:** This course is designed to teach students basic taxonomy, phylogeny, and distribution of fishes. It will also teach students basic life history characteristics of common families of fish. Some emphasis will be placed on Arkansas' fishes, but we will also emphasize important recreational, commercial, and cultured marine and freshwater species from around the world.

**Course Content:** Students will gain, through lectures, exercises, and discussions, an understanding of fundamental concepts of ichthyology including: 1) phylogenetics, 2) taxonomy, 3) family relationships and characteristics, 4) common and scientific names of marine and freshwater fish species, and 5) use of dichotomous keys to identify fish species.

**Bibliography:** The course will use various dichotomous keys and species descriptions from the following books. These will be made available in the classroom. Students are not required to purchase these books but will find them useful throughout their fisheries careers.

Eddy, S. 1978. How to Know the Freshwater Fishes. McGraw Hill, New York, New York.

McEachran, J.D., and J.D. Fechhelm. 1998. Fishes of the Gulf of Mexico, Vol. 1 Myxiniiformes to Gasterosteiformes. University of Texas Press, Austin, Texas.

McEachran, J.D., and J.D. Fechhelm. 2005. Fishes of the Gulf of Mexico, Vol. 2 Scopraeniformes to Tetraodontiformes. University of Texas Press, Austin, Texas.

Murdy, E. O. 1983. Saltwater Fishes of Texas: A Dichotomous Key. Texas A&M University, College Station, Texas.

Pflieger, W. L. 1997. The Fishes of Missouri. Missouri Department of Conservation, Jefferson City, Missouri.

Robison, H. W., and T. M. Buchanan. 1988. Fishes of Arkansas. University of Arkansas Press, Fayetteville, Arkansas.

**Instructional Resources:** A list of required fishes for visual recognition will be passed out in class. PowerPoint presentations for labs, including a picture, family, common, and scientific names of each species from each lab, are available on <\\AQFI-share\slochmann>. Sit down in front of a computer on the fisheries network. Start Internet Explorer. Paste the URL listed above into the address bar. Hit return until

the login menu appears. The password is “catfish.” Students can take a CD to the computer lab in Woodard 257 and burn the Powerpoint presentations for each lab for their personal use.

**Course Objectives:**

1. Students must be able to identify the major groups of modern fishes, lampreys, and hagfishes and draw a cladogram showing the phylogenetic relations between the groups.
2. Students must be able to diagram the phylogeny to the major fish groups beginning with the eukaryotes.
3. Students must be able to label diagrams with any general or specific fish structure typically used in dichotomous keys of fishes.
4. Students must be able to recognize by sight, and give common and scientific names of 150 fishes presented during laboratories.
5. Students must be able to use a dichotomous key to identify correctly unknown species of fish.
6. Students must be able to give the common characters of families of fishes covered during lectures.
7. Students should be able to give examples of 2-3 species of fish for any family covered during lectures and labs.
8. When presented with a series of physical characteristics of any fish species, students should be able to discern aspects of feeding practices, locomotion, and general ecology based on the characteristics.

**Evaluation:** Exams will be made of combinations of true and false, short answer, essay, and diagram labelling. Exams are CLOSED BOOK AND CLOSED NOTES unless otherwise stated by the instructor. Exams missed due to unexcused absences cannot be made up.

|                 |                      |     |
|-----------------|----------------------|-----|
| <b>Grading:</b> | Quizzes or Webquests | 20  |
|                 | Portfolio Assignment | 40  |
|                 | Exam 1               | 60  |
|                 | Exam 2               | 60  |
|                 | Exam 3               | 60  |
|                 | Exam 4               | 60  |
|                 | Exam 5               | 60  |
|                 | Lab Practical 1      | 100 |
|                 | Lab Practical 2      | 100 |
|                 | Lab Practical 3      | 100 |
|                 | Class Participation  | 40  |
|                 | Final Exam           | 200 |

A = 810 to 900 pts

B = 720 to 809 pts

C = 630 to 719 pts

D = 540 to 629 pts

F = less than 540 pts (I do not curve grades or drop a test score)

**Quizzes:** Quizzes will not be announced prior to administration. You should come to class each day prepared for a quiz. Each of the four quizzes will be worth 10 pts.

**Portfolio Assignments:**

- I. The first portfolio assignment will be the creation of a dichotomous key using four species from the same family. Students will select four species from the museum that are from the same taxonomic family. At least two of the four species must be in the same genus. Without looking at an existing taxonomic key, the students will develop a decision tree that allows a user to correctly identify all four species based on morphometrics, meristics, and general external anatomy. At least other two students must use the dichotomous trees to correctly identify the four species. The two students who used the keys will offer advice to the key’s author, who will correct/adjust the key according to suggestions and submit the key to the instructor in a typed format similar to the dichotomous keys from *Fishes of Arkansas*. This portfolio assignment is worth 20 pts.

- II. The second portfolio assignment will be a field trip to the Arkansas River. Students will use active sampling equipment to collect fish. Students will identify fish in the field by sight. Students will use the list of fish identified in the field as the basis of a brief lab report. The lab report should be written in the format of a scientific paper. The lab report should have the following sections: Introduction, Study Area, Methods, Results, Discussion, and Literature Cited. The introduction should introduce the lab. The Methods section should explain the means of fish capture. The Results section should include the family, common, and scientific names of fish collected and the number of each species collected. The Discussion should include an assessment of whether the fish collected during the lab were common for the habitat sampled and whether there were common fish in the habitat that we did not collect. Literature Cited should include any references used during the preparation of the report. Any fish that cannot be identified in the field will be returned to the lab. Students will use dichotomous keys to determine the species of each unidentified specimen. The choices each student makes in the dichotomous keys and the correct identification of the unknown species will be included in the lab report. This portfolio assignment is worth 20 pts. Remember, spelling counts, so incorrectly spelled words will be marked wrong on any assignment or exam.

**Instructional Strategies:** The strategies utilized in this course will include:

- a) Interactive Lectures, which involve students in the learning process while providing complete control to the instructor. These activities enable a quick and easy conversion of a passive presentation into an interactive experience. Different types of interactive lectures incorporate built-in quizzes, interspersed tasks, teamwork interludes, and participant control of the presentation.
- b) Webquests, which are based on a format developed by Bernie Dodge and Tom March at San Diego State University. They feature a special type of inquiry learning in which participants collect information from the Web. WebQuests focus on using information rather than merely retrieving it. A typical WebQuest requires participants to analyze, synthesize, and evaluate the information from the Web; and
- c) Closers, which are activities conducted near the end of a session. They are used for reviewing main points, tying up loose ends, planning application activities, providing feedback, celebrating successful conclusion, and exchanging information for future contacts.

**Teaching Models:** We will be using the Cognitive approach to teaching and will work mostly at the Knowledge level during the semester. We will use the “information processing approach” to developing a knowledge base. This means we will use tools and techniques to move information from sensory memory through short-term memory to long-term memory. The techniques we will attempt to develop will include imaging, pegwords, rhyming, first letter sentences, and other memory clues.

**Students with Disabilities:** It is the policy of UAPB to accommodate students with disabilities, pursuant to federal law, state law, and the University’s commitment to equal educational opportunities. Any student with a disability who needs accommodation, for example in seating placement or in arrangements for examinations, should inform the instructor at the beginning of the course. The chair of the department offering this course is also available to assist with accommodations. Students with disabilities are also encouraged to contact Mr. Ray Watley, Office of Veteran Affairs and Disability Services located in Caldwell Hall, Suite 205, telephone (870) 575-8293.

**Class Attendance Policy:** ATTENDANCE OF LECTURES IS REQUIRED. BE ON TIME. PUNCTUALITY IS A MEASURE OF RESPECT FOR YOUR CLASSMATES AND INSTRUCTOR. The University requires regular class attendance of all students. While attendance and tardiness are primarily a student-teacher relationship, the University has a concern in the proper fulfillment of such obligations by the student.

1. At the beginning of each class period, the instructor will take the roll and note attendance or non-attendance in the roll book. Each course syllabus will carry a stipulation regarding tardiness and absences.
2. When a student accumulates as many unexcused absences as the number of credit hours represented by the course, the teacher will notify the student and document the notification.
3. An absence is excused when a student is absent from class due to participating in programs, activities, etc. that are sponsored by the University and verified by the sponsor, or such as death in the immediate family, a judicial case, or serious illness, etc. These absences will be excused only when the student presents official documentation of the situation to the teacher. All other absences are unexcused.
4. When a student misses classes in excess of the number outlined in item 2 above, whether due to negligence or some other reason, the instructor will warn the student that additional absences may result in failure to pass the course.
5. Students who are consistently absent from class without an excuse will have their final class grade lowered two letter grades.

**Textbook Policy:** All students must purchase the text book and bring it to class each day. Students without a text book in class will lose class participation points for the day.

**Laboratory Rules:**

1. No food or drinks are allowed in the laboratory during labs.
2. Keep your work area clean. Only books, notebooks, and dichotomous keys should be at your workstation (backpacks, coats, etc. should not clutter your work area).
3. Discard used materials as follows:
  - Animal parts:** into receptacle specifically marked for this purpose.
  - Broken glass/sharp objects:** into receptacle specifically marked for this purpose.
  - Chemical waste:** ask the instructor for specific instructions.
  - General waste:** papers, paper towels, etc. can be discarded into the regular trash bins.
4. Wear gloves when handling specimens. Ask your instructor if you need gloves, or if you have questions about when they should be worn.
5. Be careful when handling glass jars containing preserved specimens. Keep the jars on the lab bench (away from the edge), and report any leakage of preservative to the instructor.
6. Report all injuries to the instructor immediately.
7. Become familiar with the location of first aid kits, fire extinguishers, and eyewash stations.
8. Wash your hands well with warm water and soap before leaving the laboratory.
9. Make sure your work area is clean before you leave lab. The tabletop should be wiped down with a damp sponge, all refuse should be properly disposed of, and chairs or stools should be placed under the lab bench.
10. Whenever live specimens are used, we will conform to the Aquaculture/Fisheries Center Animal Welfare Guidelines. These Guidelines are posted in the lab.

**Cell phones and pagers:** Turn off your cell phones before class. Noisy disruptions are unacceptable as is leaving the classroom to take a call. I will collect cell phones that are used during class.

| Week | Month | Date | Lectures                                | Chapter |
|------|-------|------|---|---------|
| 1    | Jan   | 13   | 1 Intro to Ichthyology, Anatomy         | 1       |
|      |       | 13   | Lab 1                                   |         |
|      |       | 15   | 2 Anatomy - Exercise                    | 2       |
| 2    |       | 20   | 3 Systematics & Classification          | 12      |
|      |       | 20   | Lab 2                                   |         |
|      |       | 22   | 4 Systematics & Classification          | 12      |
| 3    |       | 27   | 5 Evolution                             | 13      |
|      |       | 27   | Lab 3                                   |         |
|      |       | 29   | 6 Hagfishes and Lampreys                | 14      |
| 4    | Feb   | 3    | 7 Sharks, Rays, and Chimaeras           | 15      |
|      |       | 3    | Lab 4                                   |         |
|      |       | 5    | Exam 1 (Ch. 1, 2, 12, 13)               |         |
| 5    |       | 10   | 8 Sharks, Rays, and Chimaeras           | 15      |
|      |       | 10   | Lab Exam 1                              |         |
|      |       | 12   | 9 Relict Bony Fishes                    | 16      |
| 6    |       | 17   | 10 Relict Bony Fishes & Review          | 16      |
|      |       | 17   | Lab 5                                   |         |
|      |       | 19   | Exam 2 (Ch. 14, 15, 16)                 |         |
| 7    |       | 24   | 11 Eels and Herrings                    | 17      |
|      |       | 24   | Lab 6                                   |         |
|      |       | 26   | 12 Eels and Herrings                    | 17      |
| 8    | March | 3    | 13 Minnows and Catfishes                | 18      |
|      |       | 3    | Lab 7                                   |         |
|      |       | 5    | 14 Minnows and Catfishes                | 18      |
| 9    |       | 10   | 15 Salmon and Pike                      | 19      |
|      |       | 10   | Lab 8                                   |         |
|      |       | 12   | 16 Salmon and Pike                      | 19      |
| 10   |       | 17   | Exam 3 (Ch. 17, 18, 19)                 |         |
|      |       | 17   | Lab Exam 2                              |         |
|      |       | 19   | 17 Anglers, Barracuda, Cod              | 20      |
|      |       | 24   | <b>SPRING BREAK</b>                     |         |
|      |       | 24   | <b>SPRING BREAK</b>                     |         |
|      |       | 26   | <b>SPRING BREAK</b>                     |         |
| 11   |       | 31   | 18 Anglers, Barracuda, Cod              | 20      |
|      |       | 31   | Lab 9                                   |         |
|      | April | 2    | 19 Mulletts and Silversides             | 21      |
| 12   |       | 7    | 20 Mulletts and Silversides             | 21      |
|      |       | 7    | Lab 10                                  |         |
|      |       | 9    | 21 Squirrelfish, Pipefish, and Sculpins | 22      |
| 13   |       | 14   | Exam 4 (Ch. 20, 21, 22)                 |         |
|      |       | 14   | Lab 11                                  |         |
|      |       | 16   | 22 Squirrelfish, Pipefish, and Sculpins | 22      |
| 14   |       | 21   | 23 Snooks to Snakeheads                 | 23      |
|      |       | 21   | Lab 12                                  |         |
|      |       | 23   | 24 Snooks to Snakeheads                 | 23      |
| 15   |       | 28   | 25 Flounders, Puffers, Molas            | 24      |
|      |       | 28   | Lab Exam 3                              |         |
|      |       | 30   | 26 Exam 5 (Ch. 22, 23, 24)              |         |
| 16   | May   | 5    | <b>FINALS WEEK</b>                      |         |
|      |       | 7    | <b>FINALS WEEK</b>                      |         |