Bio438/BIO 538 - Ichthyology

COURSE DESCRIPTION
This course will explore the diversity and biology of fishes from an evolutionary perspective. Topics covered include: the history of ichthyology, principalcs of Phylogenetic Systematics, form and function, evolution and taxonomic diversity of major lineages, distribution, behavior, ecology, fisheries and conservation.

The laboratory portion of the course expands upon topics that cannot be covered in depth in lecture, and offers hands-on experience learning about and identifying major orders, families, genera and species of fishes, with particular emphasis on species occurring in Texan waters.

COURSE OBJECTIVES
1. Learn phylogenetic relationships of fishes
2. Learn internal and external fish anatomy
3. Explain how morphological traits correlates with adaptation to life in aquatic environments
4. Use taxonomic keys to identify freshwater fishes
5. Familiarize students with methods of collecting and studying fishes through hands-on field and laboratory experience

COURSE STRUCTURE
This course will be a mixture of lecture and laboratory (field and lab-based classes).

Lectures: There is no textbook for this course. Required material will be covered during lectures, but students are encouraged to read additional material from primary and review literature when directed to do so in lecture. Lectures will be presented with the aid of PowerPoint slide presentations, which will be made available online before or after class. Please note, PowerPoints made available online do not contain everything discussed in lectures. Students must take appropriate notes to ensure that you have adequately documented all material covered in lecture.

Laboratory:
A lab handout will be provided for each week of lab class. There will be lab exercises that students should complete during lab sessions. Students should keep a detailed journal of labs and field activities because the notebooks will be collected by the professor two times during the semester.

TEXTBOOKS (NOT REQUIRED) – Students may consult the following textbooks that deal with the Ichthyology and the diversity of fish. 1) Peter Moyle and Joseph Cech 1996. Fishes: an introduction to ichthyology. 3rd edition., 2) Gene Helfman, Bruce Collete and Douglas Facey. 1997. The diversity of fishes.


COURSE MATERIALS
Students must purchase a field notebook (*All-water, Rite in the Rain*) and a #2 pencil (or a black pen that has waterproof ink).
Some links where these items can be purchased are below:

https://www.amazon.com/Rite-Rain-Weatherproof-Side-Spiral-373

Field trips (Discussed below):
There will be 3-4 field trips associated with this course. Each field trip is focused on a different water body type (e.g., lakes, streams and large rivers).

GRADING

Lecture Exams (2 exams = 100 points each) – 200 points
Ichthyologist presentation – 20 points
Discussion /class participation – 50 points
Semester project/ presentation – 80 points
Student Peer-evaluation – 20 points

Laboratory activities
Lab/field notebook – 100 points
Mid-term lab exam – 50 points
Final-lab exam– 50 points
Field trips attendance/participation (3-4 field trips) –50 points

Total: 620 pts

Your percentage will be calculated out of 550 total points for the class. Final grades will be assigned based on the following scale: A ≥ 90.0%; 90.0% > B ≥ 80.0%; 80.0% > C ≥ 70.0%; 70.0% D ≥ 60.0%; 60.0% > F. There will no curve and no individual extra credit.

NOTE: Grades will not be discussed via email. Students are responsible for discussing their grades with the professor face to face (see Class Policies section).

ASSIGNMENT DESCRIPTION

Exams
The in-class will cover lectures, text chapters, and any other assigned material (papers, presentation, etc.) discussed in class. I will not provide exam reviews or review sessions. I hold onto all exams, tests can be viewed during office hours.

Ichthyologist presentation
Each student will give one 10-15 minute powerpoint presentations focused on the research of an influential Ichthyologist (e.g., fish taxonomist, fish ecologist, Fisheries conservation, etc.). The presentation should focus and discuss their major research accomplishments and any important studies produced (i.e., peer reviewed publications) during their career. The presentation should focus on their original research studies and not review papers. I strongly encourage students to come see me before they begin their research/presentation for guidance.
**Discussion Participation**
Students are expected to actively participate in-class discussions on assigned readings/ichthyologist presentations. To facilitate discussion, each student is required to bring in two typed questions that they will submit each class. The grade will be determined based on the frequency of their participation as well as thoughtfulness/ utility of their contributions to class discussion.

**Note:** I will provide required readings throughout the semester.

**Semester project/ presentation**

For **BIO-438** (PP presentation only) Students will work on a project that involves selecting a fish family that occurs in Texas Freshwater systems and research about its phylogenetic relationships, major aspects of its taxonomy, geographic distribution, ecological aspects and conservation status.

The project grade will be evaluated on the following factors: the quality of an abstract that summarizes the project being presented (500 words), 2) the quality of the PP presentation, 3) the quality of the student’s individual presentation of their oral presentation, 4) student evaluation by their peers.

I strongly encourage students to come see me before they begin their research/presentation for guidance.

For **BIO-538** (write a paper and PP presentation): Students will work on a specific ichthyological project assigned by Dr. Montana. Students will research and write a short paper in a scientific format. The paper must be written in the style of one of the following scientific journal formats, and strictly adhere to author guidelines: 1. *Journal of Fish Biology* (Brief Research Communication):
2. *Journal of Applied Ichthyology* (Short Communication):
3. *Fisheries Magazine* (Essays) https://fisheries.org/books-journals/fisheries-2/fisheries-guides-for-authors/ I strongly encourage students to come see me to discuss individual projects before they begin their research/presentation for guidance.

The project grade will be evaluated on the following factors: the quality of the paper being presented, 2) the quality of the PP presentation, 3) the quality of the student’s individual presentation of their oral presentation, 4) student evaluation by their peers.

Instructions for each assignment, presentation criteria, and peer evaluation criteria will be discussed at a later date, early in the semester.

Students will prepare a presentation that will be presented in power point format at the end of the semester. Students will have ~15-20 minutes to highlight the findings and defend their project.

**Field Notebook**
Students are required to keep a detailed journal of lab and field activities. The grade will be based on the completeness and quality of the notebook. In addition, students will be required to record detailed field notes for the planned field trips, over the course of the semester. Be detailed enough in your daily entries that you could open the notebook in 20 years and recreate the outing completely and come up with a list of species you would expect to find along the way. I will collect notebooks for **B10438/538** – Ichthyology – Spring 2020 in-class on March 16th 2020, and again in-class April 30th 2020.
Important dates:

**Exam 1:** 4 March 2020, in-class  
**Exam 2:** 27 April 2020, in-class  
**Mid-term lab exam:** 19 March 2020  
**Final lab exam:** 30 April 2019  

**BIO438- Abstract semester project:** 12 April 2019, hard copy paper in-class.  
**BIO538- First draft of ichthyological paper:** 20 March 2020. 2nd draft May 1st. 2020.
Submit your project paper via email to montanascg@sfasu.edu  

**Project presentations:** 29 April - 4 May

**TENTATIVE LECTURE SCHEDULE** (*Lecture course schedule is subject to change without notice*)

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<thead>
<tr>
<th>WEEK</th>
<th>TOPIC</th>
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<tbody>
<tr>
<td>1</td>
<td>Syllabus discussion/ Introduction to ichthyology</td>
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<tr>
<td>2</td>
<td>History of Ichthyology; Taxonomy, overview of ICZN and rules of nomenclature</td>
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<td>3</td>
<td>Review of major lineages of fishes</td>
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<td>4</td>
<td>Distribution and biogeography</td>
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<td>5</td>
<td>Morphology of fishes: Internal and External morphology</td>
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<td>6</td>
<td>Agnathans and the evolution of jaws</td>
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<td>7</td>
<td>Cartilaginous fishes and the lobe-finned fishes</td>
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<td>8</td>
<td>Basal ray-finned fishes: Polypteriformes to Amiiformes</td>
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<td>9</td>
<td>Teleostei: Osteoglossomorpha and Elopomorpha</td>
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<td>10</td>
<td>Teleostei: Lower Euteleostei: Salmoniformes to Myctophiformes</td>
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<td>11</td>
<td>Teleostei: Upper Euteleostei: Acanthomorpha</td>
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<td>12</td>
<td>Circulation and gas exchange, vision, locomotion and buoyancy in fishes</td>
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<td>13</td>
<td>Diets, feeding and digestion in fishes</td>
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<td>14</td>
<td>Life history of fishes</td>
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<td>15</td>
<td>Extinction, extirpation, and conservation of fishes</td>
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<tr>
<td>16</td>
<td>Project presentations</td>
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**LABORATORY SCHEDULE**

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<thead>
<tr>
<th>Lab</th>
<th>ACTIVITY</th>
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<tbody>
<tr>
<td>1</td>
<td>Introduction to fish Teaching collection</td>
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<tr>
<td>2</td>
<td>External Morphology of Fishes, Fish identification</td>
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<td>3</td>
<td>Otolith techniques, otolith extraction</td>
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<td>4</td>
<td>Diversity of Fishes 1: Agnatha to Chondrichthyes</td>
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<td>5</td>
<td>Diversity of Fishes 2: Basal bony fishes</td>
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<td>6</td>
<td>Diversity of Fishes 3: Osteoglossomorpha to Clupeiformes</td>
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<td>7</td>
<td>Diversity of Fishes 4: Ostariophysi</td>
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<tr>
<td>8</td>
<td>Diversity of Fishes 5: Euteleostei</td>
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<tr>
<td>9</td>
<td>Diversity of Fishes 6: Euteleostei</td>
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</tbody>
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*Laboratory course schedule is subject to change without notice*
FIELD TRIPS (TENTATIVE)* +

| Field trip 1 - Feb. 20th, 2020 (afternoon) | Field trip: La Nana Creek. Sampling upper reaches of the creek at Old Post Rd. |
| Field trip 2 - March 7th, 2020 (SATURDAY) all day | Neches River: sampling will include lakes, streams and main channel |
| Field trip 3 - April 2nd, 2020 | Field trip: Carrizo Bayou Creek |
| Field trip 4 - April 23rd, 2020 All afternoon | Field trip: Lake Naconiche and Naconiche Creek |

* Field trip schedule is subject to change with short notice due to weather reasons.
+ Times will be discussed with students first day of class.
+ Time provided for each trip are approximate.

PROGRAM LEARNING OUTCOMES:

PLO 1: The student will demonstrate understanding of fishes and fisheries ecology.
PLO 2: The student will demonstrate understanding and competency in surveying and collecting ichthyological data in laboratory and field settings.
PLO 3: The student will demonstrate understanding and competency in oral and written skills.
PLO 4: The student will demonstrate preparation for future career and educational goals.

STUDENT LEARNING OUTCOMES:
Student performance will be assessed with lecture exams during the semester, class presentations and discussions, article reviews, and laboratory activities through hands-on field and laboratory experience.

Students who successfully complete Ichthyology will be familiar with the following:
• Evolutionary relationships within and among major fish taxa.
• Diagnostic traits of major fish taxa.
• Behavioral, morphological, and physiological adaptations of fishes and their function ecological role in aquatic environments.
• Fishes of Texas.
• Conservation status at both regional and global scales.
CLASS POLICIES

Complete lecture notes will not be posted online: I highly recommend coming to lecture and taking notes.

Completing assignments: It is your responsibility to complete assignments independently and in a timely manner. Project assignments will be subjected to a daily loss of 10 points until submitted (this is, if a student fail to turn in an assignment on a scheduled due date, it will result in a 10 points deduction until it is submitted). I will not accept any late submissions on discussion questions.

Entering class late: Entering a lecture late can qualify as disruptive behavior when the student disturbs me during my lecture or disturbs the students around them while becoming situated. See below for more details.

Missed Exams: The only exception for an in-class exam is if the absence is planned and approved by the instructor at least 15 days prior to the date of absence or upon receipt of a documented medical excuse or an excuse provided by the office of the Vice President for Academic Affairs. In this case an alternative exam will be given. A student who wishes to make up an exam will have 7 calendar days after they return. After 7 calendar days the student will receive a “0” for that exam.

Communicating to your professor: Email will be the primary means of communication for the course. So please, check your email often. Any correspondence to your professor should follow the following format: subject line: BIO438/BIO538, to whom (Dr. or professor xx), statement, thank you, and student’s name. The professor has the right of not answering emails to those students that fail to follow this format. Note: Do not contact me via D2L as I do not utilize that method for class communication. My main method to communicate to me is via email (montanascg@sfasu.edu).

Grades cannot be discussed via e-mail at any time due to federal law. I will speak to you in person instead during my office hours. DO NOT involve a third-party who is not affiliated in an official capacity with SFASU (e.g., friend, roommate) in any matters pertaining to your enrollment in this course. Your instructor is legally prohibited from discussing most course/grade-related issues with third parties according to the Family Educational Rights and Privacy Act (FERPA) (20 U.S.C. § 1232g; 34 CFR Part 99).

Disruptive behavior policy: A student may be asked to leave the classroom for any behavior I find disruptive. A first offence will not be penalized; however, further offences may be penalized with reduction in a student’s final grade as follows: 10% for a second offence, 20% for a third offence, etc.

Plagiarism policy: A first offence will be penalized with a zero that cannot be dropped. A second offence will be penalized with an F and/or the option to drop the course. Please pay particular attention to this policy as you will be working on class projects for the semester.

Extra credit: There will be NO PERSONAL extra credit or bonus point opportunities under any circumstance or for any reason. I reserve the right to assign class bonus points at any time.
OTHER POLICIES

Lab Safety and Conduct Policy: Appropriate clothing, including pants and boots, is required for labs with an outdoor component. It is at the discretion of the instructor what appropriate dress for the field is. You may also require a jacket or rain gear in the winter and drinking water during warm weather, as appropriate. Come to lab appropriately dressed. Usage of tobacco products is not permitted in lecture or lab.

Academic Integrity (A-9.1): Academic integrity is a responsibility of all University faculty and students. Faculty members promote academic integrity in multiple ways including instruction on the components of academic honesty, as well as abiding by University policy on penalties for cheating and plagiarism. Definition of Academic Dishonesty: Academic dishonesty includes both cheating and plagiarism. Cheating includes but is not limited to (1) using or attempting to use unauthorized materials to aid in achieving a better grade on a component of a class; (2) the falsification or invention of any information, including citations, on an assigned exercise; and/or (3) helping or attempting to help another in an act of cheating or plagiarism. Plagiarism is presenting the words or ideas of another person as if they were your own. Examples of plagiarism are (1) submitting an assignment as if it were one's own work when, in fact, it is at least partly the work of another; (2) submitting a work that has been purchased or otherwise obtained from an Internet source or another source; and (3) incorporating the words or ideas of an author into one's paper without giving the author due credit. Please read the complete policy at http://www.sfasu.edu/policies/academic_integrity.asp

Withheld Grades Semester Grades Policy (A-54): Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average.

Students with Disabilities: To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go to http://www.sfasu.edu/disabilityservices/.

Responsible Use of Technology: It is expected that all students will only use cell phones, PDAs, laptop computers, MP3 players and other technology outside of class time or when appropriate in class. Answering a cell phone, texting, listening to music or using a laptop computer for matters unrelated to the course may be grounds for dismissal from class or other penalties.

Acceptable Student Behavior: Classroom behavior should not interfere with the instructor’s ability to conduct the class or the ability of other students to learn from the instructional program (see the Student Conduct Code, policy D-34.1). Unacceptable or disruptive behavior will not be tolerated. Students who disrupt the learning environment may be asked to leave class and may be subject to judicial, academic or other penalties. This prohibition applies to all instructional forums, including
electronic, classroom, labs, discussion groups, field trips, etc. The instructor shall have full discretion over what behavior is appropriate/inappropriate in the classroom. Students who do not attend class regularly or who perform poorly on class projects/exams may be referred to the Early Alert Program. This program provides students with recommendations for resources or other assistance that is available to help SFA students succeed.

**University Policy 13.9 deals with firearms and the concealed carry policy.** Students with concealed carry licenses that choose to carry on campus are required to follow all Texas laws and University policies and it is their responsibility to understand and comply accordingly. See: [http://www.sfasu.edu/policies/13.9-Firearms-Explosives-and-Ammunition.pdf](http://www.sfasu.edu/policies/13.9-Firearms-Explosives-and-Ammunition.pdf)