

BIOLOGY OF FISHERY & AQUACULTURE INVERTEBRATES

FAS 5407, SUMMER TERM C

4 CREDIT HOURS

Note: this is the syllabus for the graduate credit course only. For those taking the undergraduate version, refer to the syllabus for **FAS 4932 – Inverts**.

LECTURES: posted weekly at Canvas <https://lss.at.ufl.edu/>

INSTRUCTOR: Patrick Baker, PhD

Program in Fisheries

School of Forest Resources and Conservation, University of Florida.

email: pkbaker@ufl.edu

office tele: 352-273-3629

office at Millhopper Campus (7922 NW 72st St., Gainesville), Bldg. 544, room 30

OFFICE HOURS: Office and online meetings available by appointment.

COURSE WEBSITE: <http://elearning.ufl.edu>

COURSE COMMUNICATIONS: Quizzes and exams are administered by the course website and assignments are emailed to the course website, although they can also be emailed to the instructor directly. Unless otherwise requested on an individual basis, all other interactions between students and instructor will be via email (pkbaker@ufl.edu) or via the Canvas message board, which also links to my email. *Note: some websites misspell my email address; be sure to include the k.*

REQUIRED TEXT: none

There is no required textbook. The following texts and laboratory manuals are suggestions only, although they are recommended if you intend to stay in the field. No textbooks focus on the biology of fishery invertebrates in general, although there are many that cover a specific fishery group. Additional texts or manuscripts for specific topics will be noted during the course.

Suggested Invertebrate Zoology Texts (not required)

- Brusca, R.C., W. Moore, & S.M. Schuster (2016) *Invertebrates*. 3rd Ed. Sinauer Associates. Sunderland, MA, USA. 1104 pp. ISBN-10: 1605353752 .

- Nybakken, J.W. (1996) *Diversity of the Invertebrates: A Laboratory Manual. Gulf of Mexico Version*. McGraw Hill, Boston, MA, USA. 320 pp. ISBN-10: 0697151239.
- Pechenik, J.A. 2014. *Biology of the Invertebrates*. 8th Ed. McGraw Hill, Boston, MA, USA. 606 pp. ISBN-10: 0073524182.
- Ruppert, E.E., R.S. Fox, & R.D. Barnes (2003) *Invertebrate Zoology*. 7th Ed. Brooks-Cole, Belmont, CA, USA. 989 pp. ISBN-10: 0030259827.
- Wallace, R.L. & W.K. Taylor (2002) *Invertebrate Zoology Lab Manual*. 6th Ed. Benjamin Cummings, San Francisco, CA. 356 pp. ISBN10: 0130429376.

Writing Texts (not required, but at least one of those below is strongly recommended)

- University of Chicago Press Staff (2017) *The Chicago Manual of Style*. 17th Ed. Univ. Chicago Press, Chicago, IL. 1184 pp. ISBN-10: 022628705X
Note: earlier editions are acceptable, but a print copy is better than digital.
- Strunk, W., Jr., & E.B. White. 1995. *The Elements of Style*. 3rd Ed. Pearson, London, UK. ISBN-10: 0205191584.
Note: other editions are acceptable, but a print copy is better than digital.

ADDITIONAL INVERTEBRATE BIOLOGY RESOURCES:

Wikipedia is a useful source of information for some invertebrates, but should never be used as a reference. You may use Wikipedia to find original references, but Google Scholar (<http://scholar.google.com/>) and PubMed (<http://www.ncbi.nlm.nih.gov/pubmed>) are examples of more comprehensive databases.

Taxonomy is a rapidly advancing field and even online resources such as Wikipedia may not represent the latest revisions. The most reliable taxonomic resource for marine invertebrates is probably the World Registry of Marine Species (WoRMS, <http://www.marinespecies.org/>). Unfortunately, there is no comparable resource for the majority of freshwater invertebrates.

COURSE DESCRIPTION:

Invertebrate animals (e.g. mollusks, crustaceans, echinoderms) comprise at least 97% of described species. Many are important fisheries and some are increasingly important in aquaculture. Invertebrates are more anatomically and biologically diverse than finfish, and this diversity must be understood in order to study their fishery management or aquaculture. This course will examine the biology of marine and freshwater invertebrates that are important as fisheries or in aquaculture. Topics will include taxonomy, morphology, distribution, habitat requirements, nutrition, major predators and parasites, significant ecological interactions, and life cycles. Non-food fisheries, such as commercial sponges and pearl oysters, will also be included. The course will be organized by taxonomic groupings, or phyla. Topics will be chosen

for their biological relevance to fisheries and aquaculture, but procedural topics (methods, management, models, etc.) will not be emphasized here.

PURPOSE OF COURSE AND COURSE OBJECTIVES:

This course will introduce the student to the biology of the non-vertebrate marine and aquatic animals that humans harvest or culture. Invertebrates (e.g. mollusks, crustaceans, echinoderms, etc.) comprise the majority of animal species and many are important fisheries or aquaculture species. Invertebrates are anatomically, physiologically, and ecologically more diverse than finfish, and this diversity must be understood in order to study their fishery management or aquaculture.

By the end of this course, students will:

- Become familiar with most groups of marine and aquatic invertebrate animals that are or have been fished by humans, for food or other purposes
- Have been introduced to the major groups of marine and freshwater invertebrates that are commercially cultivated, or are being studied for commercial cultivation
- Be aware of aspects of the physiology, diet, major ecological interactions, and life cycles of marine and aquatic invertebrates that are relevant to their management or cultivation
- Have been provided with resources, including texts, original research papers, and Internet sites to allow further study in areas of individual interest

INSTRUCTIONAL METHODS:

Lectures - The lecture material, in the form of narrated Power Point presentations, will be prepared in advance and will not be live. They are posted each week at <https://lss.at.ufl.edu/>, prior to Wednesday for the topics listed in the course schedule below for that week. There are four formats, each with their advantages and limitations, as follow:

1. Stream the presentation online at the website above as an MP4 video. This is simple and the audio file plays continuously, but the Internet links do not work, and you cannot easily click back and forth through the presentation.
2. Download the color .pdf file – In this version, the Internet links work, but not the audio.
3. Download printable .pdf file – This is a smaller download, but there are no audio files or Internet links. Many students write notes on this.
4. Download .ppt file – The original PowerPoint files are very large downloads, and require you to have a recent version of PowerPoint, but everything works the way I designed it, or the way I would present it in a live lecture.

You may go through the presentations at your pace. Unless otherwise requested on an individual basis, online interactions between students and instructor will be via email (pkbaker@ufl.edu). **Use my email rather than the Canvas link if you need a response quickly.**

Quizzes - Each week (starting with the second) that there is not a larger exam, there will be a timed quiz with five multiple-choice questions taken just from the prior week's material. You may use your notes, the presentations, or any other resources to answer the questions, but there will be only fifteen minutes allowed for the entire quiz, which is insufficient time to look up the answers if you have not studied. Quizzes will be posted in Canvas (the course website) prior to Wednesday of the week they are due, are closed midnight on the following Sunday, and will have five questions each. There is no make-up if you miss the deadline, except by prior arrangement.

Exams - There will be two exams: a midterm exam midway through the course, and a final exam at the end of the course. The midterm will cover the material from the preceding weeks, and the final exam will be comprehensive. As with the quizzes, you may use any materials to answer the questions, but the exams will be timed (3 minutes per point on the exam) and there will be no make-up without prior arrangement. The questions will include both short-answer and longer questions. You will also be asked to submit electronic images of sketches for the midterm and final exams, which can be uploaded in any of several ways. If you do not have a way to upload an image, you must make prior arrangements for an alternative.

Reports. Two species reports will be required, one due halfway through the course and one at the end. The due date is midnight on Friday of the week they are due (see Course Schedule, below). Late reports will be accepted at the instructors discretion, but will suffer a penalty proportional to the lateness. More information on reports is provided separately in **Writing Assignments Guidelines for FAS 5407**, available separately on the course website.

COURSE TECHNOLOGY:

Quizzes and exams are administered online in Canvas at the course website.

COURSE POLICIES

See assignment details (at **Writing Assignments Guidelines for FAS 5407**) for more information not covered here.

LATE POLICY: Any late submissions due to technical (i.e. Internet, website, or computer technology) issues must be accompanied by the ticket number received from the Helpdesk (Learning-support@ufl.edu) when the problem was reported to them. The ticket number will

document the time and date of the problem. You must e-mail your instructor within 24 hours of the technical difficulty if you wish to request consideration for late submissions.

GRADING:

The course grade will be broken down as follows.

Quizzes	26.25% of grade
Midterm Exam	17.5% of grade
Final Exam	26.25% of grade
Report 1	10% of grade
Report 2	20% of grade

Grades are based on the cumulative of the percentages above; there is no curve. The grade cut-off values are as follow:

- 93% and above = A
- 90% = A-
- 88% = B+
- 83% = B
- 80% = B-
- 78% = C+
- 73% = C
- 70% = C-
- 68% = D+
- 63% = D
- 60% = D-

COURSE SCHEDULE

Proposed Schedule of Topics.

Each week will include 3-5 recorded lectures (PowerPoint presentations). The schedule listed below is an approximate guideline and actual times will be modified as needed, but all of the topics listed below will be covered in that approximate order. Reports are due by midnight EDT on the Friday of the week listed.

- Week 1 (May 13-17): Course Introduction & Sponges (no quiz)
 - Week 2 (May 20-24): Cnidarians: Corals & Jellyfish **Quiz 1**
 - Week 3 (May 27-31): Rotifers, Annelids, & Peanut Worms **Quiz 2**
- Note: May 26 is a holiday but this will not affect our schedule.*

Week 4 (June 3-7): <u>Mollusks: Introduction & Gastropods</u>	Quiz 3
Week 5 (June 10-14): <u>Mollusks: Bivalves</u>	Quiz 4
Week 6 (June 17-21): <u>Mollusks: Bivalves & Lophophorates</u> Topic for final report due to instructor for approval. Mid-Summer Break (June 22-30) NO CLASSES	Quiz 5 Report 1 Due
Week 7 (July 1-5): <u>Mollusca- Cephalopods</u> <i>Note: June 4 is a holiday but this will not affect our schedule.</i>	Midterm Exam
Week 8 (July 8-12): <u>Arthropods – Introduction</u>	Quiz 6
Week 9 (July 15-19): <u>Crustaceans: Shrimp & Prawns</u>	Quiz 7
Week 10 (July 22-26): <u>Crustaceans: Lobsters & Crayfish</u>	Quiz 8
Week 11 (July 29-Aug. 2): <u>Crustaceans: Crabs & Echinoderms</u>	Quiz 9
Week 12 (Aug. 5-9): <u>Echinoderms & Chordates</u>	Final Exam Report 2 due

UNIVERSITY OF FLORIDA POLICIES:

UNIVERSITY POLICY ON ACCOMMODATING STUDENTS WITH DISABILITIES: Students requesting accommodation for disabilities must first register with the Dean of Students Office (<http://www.dso.ufl.edu/drc/>). The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation. You must submit this documentation prior to submitting assignments or taking the quizzes or exams. Accommodations are not retroactive, therefore, students should contact the office as soon as possible in the term for which they are seeking accommodations.

UNIVERSITY POLICY ON ACADEMIC MISCONDUCT: Academic honesty and integrity are fundamental values of the University community. Students should be sure that they understand the UF Student Honor Code at <http://www.dso.ufl.edu/students.php>.

NETIQUETTE: COMMUNICATION COURTESY: All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussions and chats. <http://teach.ufl.edu/docs/NetiquetteGuideforOnlineCourses.pdf>

GETTING HELP:

For technical difficulties for E-learning in Canvas, please contact the UF Help Desk at:

- Learning-support@ufl.edu
- (352) 392-HELP - select option 2
- <http://elearning.ufl.edu>

For Library Help Desk support, navigate to the UF George A. Smathers Libraries at <http://cms.uflib.ufl.edu/> and click the links in the top bar of the web page.

Other resources are available at <http://www.distance.ufl.edu/getting-help> for:

- Counseling and Wellness resources
- Disability resources
- Resources for handling student concerns and complaints

The School of Forest Resources & Conservation, the department that hosts this course, cares about your experience and we will make every effort to address course concerns. We request that all of our online students complete a course satisfaction survey each semester, which is a time for you to voice your thoughts on how your course is being delivered.

If you have a more urgent concern, your first point of contact should be the Academic Programs Coordinator or the Graduate/Undergraduate Coordinator for the program offering the course. You may also submit a complaint to UF administration:

Students in online courses: <http://www.distance.ufl.edu/student-complaint-process>

Students in face-to-face courses:

https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf