

**COURSE SYLLABUS—Spring 2017**  
**BIOL 4471; Invertebrate Zoology--4 credit hours**

**Important Note:** This syllabus is subject to change at the discretion of the instructor

**Lecture:** MWF 11:00-11:50 a.m. in Lee Drain 204

**Lab:** Wed 3:00-5:50 p.m. at the SHSU Natural History Collections

**Instructor:** Dr. Tamara J. Cook

**Office:** TRIES 189E

**Phone:** 294-1557

**Email:** tcook@shsu.edu

**Office Hours:** MWF 9:00 - 10:50 a.m.; or by appointment

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**EVALUATION:**

Point Source	Number	Points	Total
Lecture Exams	3	100 each	300
Major Paper	1	100 each	100
Laboratory Exams	1	100 each	100
Laboratory Drawings	10	10 each	100
<b>Total</b>			<b>600</b>

**GRADING:**            A = 540+        B = 480-539    C = 420-479    D = 360-419    F < 360

**LECTURE TEXT:** *Invertebrates* 3<sup>rd</sup> edition, by Brusca & Brusca

**COURSE CONTENT & GOALS:** Lectures will focus on the comparative morphology, life history, physiological adaptations, ecology, and evolution of invertebrate animals with a strong emphasis on the word **comparative**. Laboratory exercises will focus on morphology and classification and are designed to hone your observation and interpretation skills (because that is what scientist do: *observe and interpret*). To that end, all labs will include extensive drawing and examination of material. It is my sincere hope that you come away from this course with a lively appreciation of the diversity and wonder of invertebrates; an informed perspective on the importance of invertebrates to the world's ecosystems; and an understanding of their importance to scientific thought and human culture.

**PREPARATION AND EXPECTATIONS:** You are expected to attend all lecture and laboratory sessions. Invertebrate Zoology is an advanced course that will demand careful preparation and study, and as such, good attendance is absolutely essential for success in meeting the basic requirements in the course. Further, the lectures are drawn from a wide variety of sources including the primary literature. The textbook serves as a reference, but the course does not directly track its content. Because of the quantity of material we cover in this class, it will be to your advantage to keep up on your readings and to regularly attend lecture. **TAKE NOTES!** I will not post my lecture slides on blackboard. **IT IS YOUR RESPONSIBILITY TO COME TO CLASS AND TO TAKE NOTES!** Because your laboratory notebook is a significant portion of your grade and because the scheduled lab time is the **ONLY** time you will be able to complete assignments, there are obviously serious penalties for missing labs!

***Be prepared to assimilate much new material. BUT...also be prepared for a great deal of uncertainty; much remains to be discovered!***

## EXPLANATION OF COURSE EVALUATION

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### LECTURE EXAMINATIONS (300 points):

There will be three lecture exams (100 points each). All exams are comprehensive in that you must understand and be able to build on concepts presented in previous lectures. The format for all exams will consist of matching, true/false, labeling diagrams, fill in the blank, short answer, and essay questions. All short answer and essay questions will be graded based on comprehension of the question and articulation of the answer and you must use complete sentences. Spelling will count on all answers. Exams will require you to not only recall definitions and facts, but also to understand their meaning and context and to synthesize information from more than one lecture.

### RESEARCH PAPER (100 points):

You must write a paper on a topic selected from the accompanying list and prepared according to the following guidelines. **Your introduction and references are due March 10 and your final paper is due by 5:00 p.m. on April 28.**

1. It must contain at least 10 full pages of typing and illustrations, although no more than two full pages can be taken up by illustrations. It must be double-spaced with one-inch margins and should be in 11 point Times New Roman or Calibri font.
2. One-half to a full page should be an introduction. One-half page should be a statement or analysis of the major questions or problems associated with the topic. Three to five pages should consist of observations or evidence that have bearing on the questions or problems you have raised. One to two pages should be on recommendations for specific research to solve the problems or answer the questions, and the remainder should concern the significance of the work you have discussed. Give each of these sections a heading
3. You should cite at least seven references that you used to obtain information for your paper. At least four of your references must be from the primary literature.
4. Grading will be according to the following:

Compliance with format	25%
Adequacy of reference material and figures	25%
Biological validity	25%
Preparation quality	25%

### LAB PRACTICAL (100 points):

There will be one lab exam worth 100 points. It will be in practical form where you will be asked to identify structures and specimens. You are not allowed to touch the specimen or the microscope (except for the fine tuning dial). Spelling will count. **There will be NO MAKE-UP exams given. Under the event of an excused absence, you will be required to turn in an alternate assignment deemed appropriate by me.**

### LABORATORY DRAWINGS (100 points):

You are to prepare, **in lab**, a set of ten, original, comparative drawings of lab material **as you observe it**, along with lab notes on the drawings. Each drawing must be turned in with a single page of typed, double-spaced text explaining the differences, similarities, and significance in/of these drawings. I am not particularly interested in artistic ability; I am very interested in your attempt to record and explain what you see. Drawings are due on May 3.

**MAKE-UP POLICY:** There will be NO MAKE-UP exams given. In the event of an excused absence (verified with written documentation), you will be required to turn in an alternate assignment deemed appropriate by me.. If you know in advance that you will miss an exam because of a religious event or because you are conducting official Sam Houston State University business, you may arrange to pre-take the test if you supply written verification for the reason you will miss the exam.

## LIST OF RESEARCH PAPER TOPICS

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You may choose from any of the following topics, but only one student can work on a particular topic. As soon as you have decided on a topic, let me know. You must select a topic by February 10. However, the sooner you decide the better choices you will have. Your introduction and references are due March 10 and your final paper is due by 5:00 p.m. on April 28. **There is a 10 point per day late penalty.**

Please feel free to come by my office hours at any time if you have questions, need suggestions or would like me to review/edit your work.

- Particle selection mechanisms in filter feeders
- Skeletal adaptations of sponges to marine and freshwater environments
- Cnidocyte variation in the Cnidaria
- Life history of reef building corals
- Reproductive biology of rotifers
- The phylogenetic position of the phyla Onychophora and Tardigrada
- Reconstructing the lives of trilobites
- Feeding ecology in the annelid class Polychaeta
- Dormancy in invertebrates
- Adaptations of gastropods to terrestrial habitats
- Evolution of larval types in the molluscan class Bivalvia
- Cognitive behavior of cephalopods
- Regeneration in free-living flatworms
- Effect of parasitic barnacles (rhizocephalans) on crustacean biology
- Reproductive patterns of deep-sea invertebrates
- Acanthocephalans: modification of host behavior
- Behavior of solfugids (sun spiders)
- Oxygen transport in invertebrates
- The function of echinoid surface structures
- Mutable connective tissue in the echinoderm class Holothuroidea

## TYPES OF RESEARCH ARTICLES

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**Primary** research articles (also called **primary literature**) are those which, when published, provide the first descriptions, results, and interpretations of experiments, theoretical models, or conceptual issues. Primary research articles are subject to a rigorous review process before publication; they are read by at least two (often three) specialists in the field, and found to be acceptable for publication. This doesn't mean that every article is a fantastically creative (or even correct!) example of research, but at least two reviewers and a journal editor thought it was worthy of publication. Journals that summarize, review, and discuss previously published primary literature comprise the **secondary literature**. Publications that summarize a combination of primary literature and secondary literature comprise the **tertiary** literature. Textbooks and chapters in more specialized technical books are both examples of tertiary literature. While the secondary and tertiary literature are excellent sources of introductory information, the primary literature is where the action is. As biology majors, you should be at ease with the primary literature as this is where active investigators read about and write about the frontier of research. I recommend using either Biological Abstracts or Web of Science (Biological Abstracts goes back farther in time, but Web of Science indexes more journals), online databases available through the Newton Gresham Library, to begin your literature search.

**Please see me a.s.a.p. if you have never before conducted a literature search!**

## TENTATIVE LECTURE SCHEDULE

Date		Topic	Chapter
Jan	16	Course introduction/General Principles	1
	20	Classification, Systematic, Phylogeny	2
	23-25	Animal Architecture & the Bauplan Concept	4
	27-30	Animal Development, Life Histories, & Origins	5
Feb	1	Placozoa & Porifera	6
	3-6	Porifera; start Cnidaria	6/7
	8-10	Cnidaria	7
	13	Ctenophora	8
	15	Introduction to the Bilateria	9
	17	<b>Exam 1</b>	
	20-22	Platyhelminthes	10
	24	Four Weird Ones & Nemertea	11/12
	27-Mar 3	Mollusca	13
	6-10	Annelida	14
	13-17	<b><i>Spring Break—No class</i></b>	
Mar	20	Two more enigmas	15
	22	Gnathifera	16
	24	Lophophorates	17
	27	What is an ecdysozoan & Nematoida	18
	29	Scalidophora	19
	31	<b>Exam 2</b>	
	3	Arthropod relatives	20
	5-7	Arthropoda: Crustacea	21
	10-12	Arthropoda: Hexapoda	22
	14	<b><i>Good Friday Holiday</i></b>	
	17	Myriapoda	23
Apr	19	Chelicerata	24
	21	<b><i>No Class—I will be at a conference</i></b>	
	24	Finish Chelicerata	
	26-28	Echinodermata	25
	1	Hemichordata	26
	3	Invertebrate chordates	27
	5	Perspectives in Invertebrate Phylogeny	28
	10	<b>Exam 3 from 12:00-2:00 p.m.</b>	
May			

## TENTATIVE LABORATORY SCHEDULE

*For lab you will need a good drawing pencil (preferably NOT #2 soft lead pencils as these tend to smudge), a good eraser, and some high quality slick finish paper (8<sup>1/2</sup> x 11).*

Date		Topic
Jan	18	No lab
	25	Lecture on Animal Architecture or Animal Development (only 1 hour!) Discuss nature and requirements of the laboratory portion of the course
Feb	1	Porifera
	8	Cnidaria
	15	Platyhelminthes
	22	Collecting inverts (weather permitting)
Mar	1	Mollusca
	8	Annelida
	13	<b>Spring Break—no lab</b>
	22	Collecting inverts (weather permitting)
Apr	29	Gnathifera, Nematoda, and Miscellaneous Arthropod relatives
	5	Arthropoda: Crustacea
	12	Arthropoda: Hexapoda
	19	Arthropoda: Myriapoda & Chelicerata
	26	Echinodermata
May	3	<b>Lab Practical</b>

## MISCELLANESOUS IMPORTANT STUFF

**ACADEMIC DISHONESTY:** All students are expected to engage in all academic pursuits in a manner that is above reproach. Students are expected to maintain complete honesty and integrity in the academic experiences both in and out of the classroom. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action. The University and its official representatives may initiate disciplinary proceedings against a student accused in any form of academic dishonesty including, but not limited to, cheating on an examination or other academic work which is to be submitted, plagiarism, collusion and the abuse of resource materials. ***I TAKE CHEATING VERY SERIOUSLY AND ANYONE CAUGHT CHEATING WILL AUTOMATICALLY FAIL THIS COURSE***

**CELL PHONE USE:** During exams, cell phones and any other equipment capable of receiving, recording and/or transmitting information, must be put away in a book bag or purse. In short, it must not be readily accessible or accessed during an exam. ***If I even SEE such devices during an exam, I will take this as defacto evidence of cheating and you will receive a zero for that exam and may fail the course.***

**CLASSROOM RULES OF CONDUCT:** Students are expected to assist in maintaining a classroom environment that is conducive to learning. Students are to treat faculty and students with respect. Students are to turn off all cell phones while in the classroom. Under no circumstances are cell phones or any electronic devices to be used or seen during times of examination. Students may tape record lectures and/or take notes using a laptop computer ***provided they do not disturb other students in the process.***

**STUDENT ABSENCES ON RELIGIOUS HOLY DAYS:** Students are allowed to miss class and other required activities, including examinations, for the observance of a religious holy day, including travel for that purpose. Students remain responsible for all work. *See Student Syllabus Guidelines.*

**VISITORS IN THE CLASSROOM:** Only registered students may attend class. Exceptions can be made on a case-by-case basis by the professor. In all cases, visitors must not present a disruption to the class by their attendance. Students wishing to audit a class must apply to do so through the Registrar's Office.