COURSE SYLLABUS for BIO 5368
Advanced Invertebrate Zoology; 3 credit hours; Spring 2018; **LDB 125, M 5:00-7:50 p.m.**
Important Note: This syllabus is subject to change at the discretion of the instructor

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Office Hours: by appointment

COURSE DESCRIPTION: Invertebrates are the dominant form of life on earth, comprising greater than 75% of all described species. We will briefly discuss phylum/class level characteristics of the major groups of invertebrate animals. The majority of the course will deal with the evolutionary history and phylogeny of invertebrates, invertebrate ecology, and the myriad solutions invertebrates have evolved to deal with the common problems of reproduction, feeding, osmoregulation, respiration, locomotion and developmental patterns.

COURSE OBJECTIVES: I sincerely 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. **Be prepared to assimilate much new material. BUT…also be prepared for a great deal of uncertainty; much remains to be discovered.**

EVALUATION:	3 Exams @ 150 pts each	450 pts
	Major Paper	200 pts
	10 abstracts @ 5 pts each	50 pts
	TOTAL POSSIBLE POINTS	**700 PTS**

GRADING: A = 630+ B = 560-629 C = 490-559 D = 420-489 F < 420

EXPLANATION OF COURSE EVALUATION

EXAMS: There will be three take home exams. The first exam will evaluate how much you have absorbed of general invertebrate characteristics. The other 2 exams will evaluate your ability to synthesize information from lecture and the primary literature. You will be given one week to complete the exam and all answers must be typed and cited appropriately. All exams are worth 150 points each for a total of 450 points towards your final grade.

ABSTRACTS: You are to prepare a short (~ one page) typewritten abstract for ten articles from the invertebrate primary literature. You may NOT use articles I assign in class or articles you use to write your research paper, and you may NOT use review articles. As graduate students you should be at ease with the primary literature as this is where active investigators read about and write about the frontier of research. Each abstract is worth 5 points for a total of 50 points of your final grade.

RESEARCH PAPER (100 points):

You must write a paper on a topic to be selected from the accompanying list. Feel free to see me anytime if if you have questions, need suggestions or would like me to review/edit your work. The paper must be prepared according to the following guidelines:

1. It must contain at least 12 full pages of typing and illustrations, although no more than two full pages can be taken up by illustrations. The typing is to be double spaced with one inch margins and should be in an easily readable 12 point font.
2. One-two pages should be an introduction. One 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've 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've discussed. Give each of these sections a heading
3. You should cite at least 10 references that you used to obtain information for your paper. At least six of your references must be from the primary literature.
4. I don't particularly care what citation format you use, but you must pick a format and use it consistently throughout your paper. I suggest you follow the format of the journal to which you are likely to submit your thesis research (it'll be good practice!).
5. Grading will be according to the following:

Adequacy of reference material and introduction	50 points
Preparation quality of first draft	50 points
Final draft	
Compliance with format	25 points
Adequacy and relevance of figures	15 points
Biological validity	35 points
Preparation quality*	25 points

*including, but not limited to. appropriate grammar and sentence structure and lack of typographical errors (spelling, citation format etc…)

Research Paper Due Dates:

Introduction and Refererences	**February 19, 2018**
First Draft	**March 19, 2018**
Final Draft	**April 23, 2018**

LIST OF RESEARCH PAPER TOPICS

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 5, 2018. However, the sooner you decide the better choices you will have. **There is a 10 point per day late penalty for all listed due dates!**

Particle selection mechanisms in filter feeders
Skeletal adaptations of sponges to marine and freshwater environments
Cnidocyte variation in the Cnidaria
Evolution of Cryptobiosis in Tardigrada
Life history of reef building corals
Reproductive biology of rotifers
The phylogenetic position of the phyla Onycophora and Tardigrada
Dormancy in invertebrates
Evolution of larval types in the molluscan class Bivalvia
Cognitive behavior of cephalopod
Effects of parasitism on invertebrate fitness (select either a parasitic phylum or a host phylum)
Oxygen transport in invertebrates
Are the phyla Nemata and Arthropoda sister taxa?
The phylogenetic position of the lophophorates
Mutable connective tissue in the echinoderm class Holothuroidea

GENERAL COURSE OUTLINE

Subject area 1—General taxonomic survey of invertebrate phyla (Jan 22, 29 Feb 5)

- We will spend the first three weeks of the semester surveying the 33 or so invertebrate phyla. Lectures will focus on phylum/class level characteristics and life history traits.
- Lecture material taken from a variety of general invertebrate zoology texts
  - *Invertebrates* 3rd edition, by Brusca, Moore & Shuster, Sinauer Associates
  - *The Invertebrates: a synthesis, 3rd edition; by Barnes et al, Blackwell Science*
  - *Invertebrate Zoology* 7th edition, by Ruppert Fox, & Barnes, *Saunders College Publ.*
- **First exam Feb 12; due Feb 19)**

Subject area 2—evolutionary history and phylogeny (Feb 12, 19, 26, Mar 5, 19)

- We will spend approximately 5 weeks discussing issues such as the evolution of body plans, sources of evidence in invertebrate phylogeny, various invertebrate phylogenetic schemes, and time permitting, the phylogeny of some of the major invertebrate groups.
- Lecture material taken from the the primary literature and the following texts:
  - *Invertebrate Relationships, by Willmer, Cambridge University Press*
  - *The Shape of Life, by Raff, University of Chicago Press*
  - *Animal Evolution 2nd edition, by Nielsen, Oxford University Press*
- **Second exam Mar 26; due Apr 2**

Subject area 3—comparative functional biology (Mar 26, Apr 2, 9, 16, 23, 30)

- We will spend 6 weeks considering the myriad solutions invertebrates have evolved to deal with the common problems of reproduction, feeding, osmoregulation and locomotion. If time permits, we will also discuss developmental patterns, respiration and control systems.
- Lecture material will come from the primary literature and the following text
  - *The Invertebrates: a synthesis, 3rd edition; by Barnes et al, Blackwell Science*
- **Third exam Mar 30; due May 7**

ORGANIZATION:

The first three weeks (general survey of invertebrate phyla) will be standard lecture presentations using PowerPoint. During this time, the lecture period will be broken into three 50 minute sections, with 10 min. breaks in between.

The first hour of all lecture periods following the general invertebrate survey will be devoted to class discussion. In general this is how it will work:

- Each week you will be given a short assignment based on that week's lecture topic
  - All assignments will involve reading journal articles.
  - I will either give you a paper to read or ask you to find an article about a particular group of invertebrates or some aspect of invertebrate physiology or ecology
  - Occasionally, I may ask you to work in teams and prepare a short lecture to be presented to the class on a particular topic and select an article for class discussion.
- You should read the articles thoroughly and be prepared to discuss them during the first hour of the following following week's lecture period

STUDENTS WITH DISABILITIES: It is the policy of Sam Houston State University that no otherwise qualified disabled individual shall, solely by reason of his/her handicap, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any academic program. Disabled students may request assistance with academically related problems stemming from individual disabilities by contacting the Director of the Counseling Center in the Lee Drain Annex or by calling (936)294-1720.

ACADEMIC DISHONESTY: All students are expected to engage in all academic pursuits in a manner that is above reproach. Students are expected to maintatin 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 acadmic 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.

VISITORS IN THE CLASSROOM: Unannounced visitors to class must present a current, official SHSU identification card to be permitted in the classroom. They must not present a disruption to the class by their attendance. If the visitor is not a registered student, it is at the instructor's discretion whether or not the visitor will be allowed to remain in the classroom.

RELIGIOUS HOLY DAYS: University policy states that a student who is absent from class for the observance of a religious holy day must be allowed to take an examination or complete an assignment scheduled for that day within a reasonable time after the absence. Students must be excused to travel for observance of a religious holy day. A student who wishes to be excused for a religious holy day must present the instructor with a written statement describing the holy day(s) and the travel involved. The instructor will provide the student with a written description of the deadline for the completion of the missed exams or assignments.