BIO310 Invertebrate Zoology, Lecture Syllabus, Spring 2012

Instructor: Ryan Fisher PhD.
Office: MH418
Phone: 978-542 6841
Classroom: MH544
Email: ryan.fisher@salemstate.edu

Office Hours: Tues: 9 - 10am
Weds: 1 - 2pm
Thurs: 9-10am
Fri: 12 – 1pm

Class Times: Tues. and Thurs. 10.50am – 12.05pm

If you need to see me urgently outside the office hours above please contact me by phone or email.

Course Description:
The morphology, physiology, ecology, taxonomy, and systematics of invertebrates are studied. Required field trips, including two full day trips, perhaps on weekends, to local habitats and scientific institutions for observation of aquatic and terrestrial invertebrates will be conducted. Three lecture hours and two two-hour laboratories per week.

Course Goals:
1. To acquire an understanding of the evolutionary relationships that link the invertebrate animal phyla
2. To acquire an appreciation of the diversity of the invertebrate animal phyla
3. To acquire an understanding of the increasing complexity of anatomies across the invertebrate animal phyla
4. To acquire an understanding of the various scientific techniques including: library research and, critical and analytical thought processes required in scientific essay writing.

Course Objectives:
After completing this course students should be able to:
1. Describe the evolution of the invertebrate phyla based on the current knowledge of traditional and molecular techniques.
2. Describe the basic anatomy, physiology, lifecycles and ecology of the invertebrate phyla.
3. Explain the significant evolutionary steps that link the Phylum Porifera to the Phylum Chordata.
4. Demonstrate competence in library research and science essay writing.

BIO 310 – Learning Objective- Assessment Matrix for Spring 2012

Learning Objective	***Where Addressed***	***How assessed***
1. Describe the evolution of the invertebrate phyla	Lectures, dvd presentations, guest talks, primary literature	Semester exams, fact sheets, final exam
2. Describe the basic anatomy, physiology, lifecycles and ecology of the invertebrate phyla.	Lectures, dvd presentations, guest talks, primary literature	Semester exams, fact sheets, critical essay, Darwin Festival talks, final exam
3. Explain the significant evolutionary steps that link the Phylum Porifera to the Phylum Chordata.	Lectures, dvd presentations, guest talks, primary literature	Semester exams, fact sheets, final exam
4. Demonstrate competence in library research and science essay writing	Discussions in lecture	Fact sheets and critical essay

Textbooks:
Lectures:
Brusca, R.C. and G.J. Brusca, 2003. Invertebrates – 2nd edition. Sinauer Associates, Sunderland, MA. 936pp. ISBN: 978-0-87893-097-5.

Lab:
Fisher R., 2012. BIO310 Invertebrate Zoology – Laboratory Manual.

Plagiarism:
Plagiarism in any form will not be tolerated. Students should never copy the work of another student or reference and present it as their own work. Cheating by using written material during an exam is also forbidden. Anyone caught cheating or plagiarizing work will receive zero for that exam or assignment and may receive an F as the final course grade. Further action may be taken in accordance with the Academic Dishonesty Policy. This can be accessed at:
http://catalog.salemstate.edu/content.php?catoid=13&navoid=1295#Academic_Integrity

Grading:
Your overall grade comprises both lecture and laboratory components. It is made up as follows:

	Points
Two semester exams (75 points each)	150
Comprehensive final exam	200
Critical Essay	100
Darwin Festival	50
Organism Fact Sheets	75
Earth Day Poster	75
Laboratory	350
Total	**1000 = 100%**

Grades are based on a standard grading scale: A – 93-100%, B – 83-89.9%, C-73-79.9% etc. There will be four homework assignments. Presentations will be presented during the last class of the semester. *You are responsible for completing all course requirements whether you are present or not.* **If you miss 2 labs you receive zero and fail the course!**

Attendance:
Class attendance is compulsory! It is in your best interest to attend all classes.

Exams:
Exams will comprise multiple-choice questions, true-false type questions and short answer questions. Each semester exam will cover work from the preceding exam. The final exam will be comprehensive, 50% of the grade will come from the last segment of work while the other 50% will cover work already examined. **If classes are cancelled due to poor weather, the exam will be held in the next lecture class.**

Electronic Devices during Assessments
According to Department policy, **NO electronic devices may be used during assessments**. Stand-alone calculators or devices pre-approved by the instructor are the only exceptions. Any student with a visibly exposed electronic device may receive a **ZERO** for that exam/quiz.

Field Trips:
Intertidal Rocky Shore
In the spring we will have a fieldtrip to a local rocky shore on the Nahant Peninsula. This will take place on **Wednesday April 11th, 2012 from 8 – 10.30am** (low tide at 9.30am, -1.2ft.). The field trip will entail general and specific observations of the rocky shore inhabitants with the primary focus being on the Phylum Mollusca.

Intertidal Mudflat
The lab covering Class Polychaeta within the Phylum Annelida will commence on sediment flats near to the university during lab time on **Friday April13th, 2012 from 8.30am to 10.30am** (low tide at 11.30am; 0ft.).

Visits to Local Institutions
As an introduction to the course we will visit the New England Aquarium on **Saturday January 28th, 2012**. We will carpool from Salem State University. You will be required to cover your entrance fee.

We will also visit the Natural History Museum at Harvard University in February (dates to be arranged). We will have a tour of the Marine Invertebrates Section.

Critical Essay:
Every invertebrate is adapted to living in its habitat. With this in mind you must write an essay on an unusual animal adaptation that you have encountered within the invertebrate phyla. The essay must be 3-5 typed pages in 12 point font and double spaced. You must discuss an interesting anatomical, physiological or behavioral adaptation using at least 8 peer-reviewed scientific references.

You will write 2 drafts of the essay for grading.

The first draft must be exchanged via email with your group by **Monday February 27th, 2012**. Your draft will be read by each of the 2 people (excluding yourself) in your group and comments made. You will then discuss these comments in class on **Thursday March 1st, 2012**. A second draft, as well as the comments from your group, must be submitted to me by **Monday March 26th, 2012**. *This second draft, with comments, will contribute a maximum of 25% of the essay grade*. These will be returned with minor comments. Submission of the final draft is by email on **Monday April 9th, 2012.**

See Appendix A for grading guide.

The 33rd Darwin Festival
(http://www.salemstate.edu/~pkelly/darwin/)
This is a unique event in any university setting. All classes and labs do not run for this week within the Biology Department. Students must attend 2 talks from visiting speakers and complete the worksheet for each talk. Details of specific talks will be given closer to the festival week. Any students witnessed by me asking questions at the end of a talk will get a 10% addition to their summary grade.

Organism Fact Sheets
This course covers all the animal phyla, a huge amount! To assist you with remembering all the phyla (and the various terms for each) you will submit at each lecture from lecture 3 a one sided fact sheet describing an interesting organism from the previous lecture's animal phylum. The fact sheet should be in bullet point form and include: full taxonomic name, basic external structure, feeding, general internal structure, sense organs, reproduction and life history, general ecology, a small picture with caption and, references. (See appendix B)

Earth Day Poster
This year's Earth Day's will be held the week of April 9th – 13th, 2012. The Earth Day Poster competition will be held during Community Time on Monday April 9th. This year's theme is 'Ocean's in Peril'. You may cover any marine animal/animal group that is being significantly affected by human impact. For example, increase in ocean temperatures is leading to coral bleaching in many tropical reefs.
Your poster should be done professionally (see Appendix C) and we will hold a session in class on Tuesday April 3rd, 2012.

Tutoring:
To assist you in your journey through this course each student is required to meet with me once before spring break (March 12-16, 2012) to discuss the course and your performance.

Make-ups:
Absence from an exam/quiz for a **valid reason** (death in family, serious illness, official college event) is allowed provided you inform me in advance of the exam. A make-up exam can then be scheduled. I do not allow *extra credit* work.

Classroom Culture:
The classroom is a forum for learning and as such should be respected. A relaxed, informal environment is conducive to learning but there are basic standards of behavior. So that everyone may have the same opportunity to learn please be mindful of the following:

1. Please be on time for class – walking in late not only distracts the instructor but also fellow students.
2. Please keep talking to a minimum unless you are asking questions in which case do not be shy.
3. Please be tolerant of others questions – we all learn at different speeds and another's question may actually help those who are too shy to ask.
4. Food and drink are not allowed in the class at any time.

Please turn off your electronic devices during class ie pagers and cell phones. *Disruptive behavior will not be tolerated and will lead to suspension from the class. If you are suspended you will need to meet with me to discuss why you should be readmitted.*

Assistance:
Salem State University has excellent facilities to help students be successful. These include: the Reading Laboratory (Campus Center Lower Level, 542-6214); the Writing Center (220 Meier Hall, 542-6847); the Mathematics Laboratory (Sullivan 306, 542-6348). If you have a disability the Office for Students with Disabilities can assist you (Meier Hall 102, 542-6217). Please make use of these services if you are having trouble.

Access Policy:
Salem State University is committed to providing equal access to the educational experience for all students in compliance with Section 504 of the Rehabilitation Act and The Americans with Disabilities Act and to providing all reasonable academic accommodations, aids and adjustments. Any student who has a documented disability requiring an accommodation, aid or adjustment should speak with the instructor immediately. Students with Disabilities who have not previously done so should provide documentation to and schedule an appointment with the Office for Students with Disabilities (Meier Hall 102, 978 542 6217) and obtain appropriate services.

BIO 310 – Tentative Course Syllabus – Spring 2012

Week of:	**Lecture**	**Topic**	**Reading**
January 16th	1	Introduction	Ch. 1
	2	Classification & Bauplan	Ch.2 & 3
January 23rd	3	Development	Ch. 4
	4	The Protists	Ch. 5
January 30th	5	Porifera	Ch. 6
	6	DVD: "Life on the Move"	
February 6th	7	Cnidaria & Ctenophora	Ch. 8/9
	8	Playhelminthes	Ch. 10
February 13th		**Darwin Festival**	

February 20th		**Exam I (Lectures 1-8)**	
	9	Nemertea	Ch11
February 27th	10	Meiofauna ***Essay Work***	Ch. 12
March 5th	11	Rotifera to Entoprocta	Ch.12
	12	Nematoda	Ch12
March 12th		**Spring Break!!**	
March 19th	13	Annelida/Sipuncula/Echiura	Ch13/14
	14	Arthropod I	Ch15
March 26th	15	Arthropod II	Ch16
	16	Arthropod III	Ch17
April 2nd		**Exam II (Lectures 9 – 16)** **Earth Day Posters**	
April 9th	17	Arthropod IV	Ch18/19
	18	DVD: "The Conquerors"	
April 16th	19	Mollusca	Ch20
	20	Lophophorates	Ch21
April 23rd	21	Echinodermata	Ch22
	22	Deuterostomes	Ch23
April 30th	23	Sum Up and Final Review	

Final examination: Tuesday May 8th, 2012 11am – 1pm
Format - The final exam will be comprehensive, 50% of the grade will come from the last segment of work (lectures 23-33) while the other 50% will cover work already examined (lectures 1-22).

Appendix A: Grading Guide and Rubric for Critical Essay, Spring 2012
The grading breakdown for your essay is below:

Introduction *10%*
(Provided enough background, reputable sources – papers, texts, web sites, an outline of essay focus)

Synthesis *60%*
(Logical argument to support focus stated in introduction, cited 8 peer-reviewed scientific papers)

Conclusion *10%*
(Provided a brief and focused conclusion)

References *10%*
(Correctly referenced, 8 separate papers)

Style *10%*
(Correct scientific usage: species names in italics, correct citing in the text, spelling, grammar)

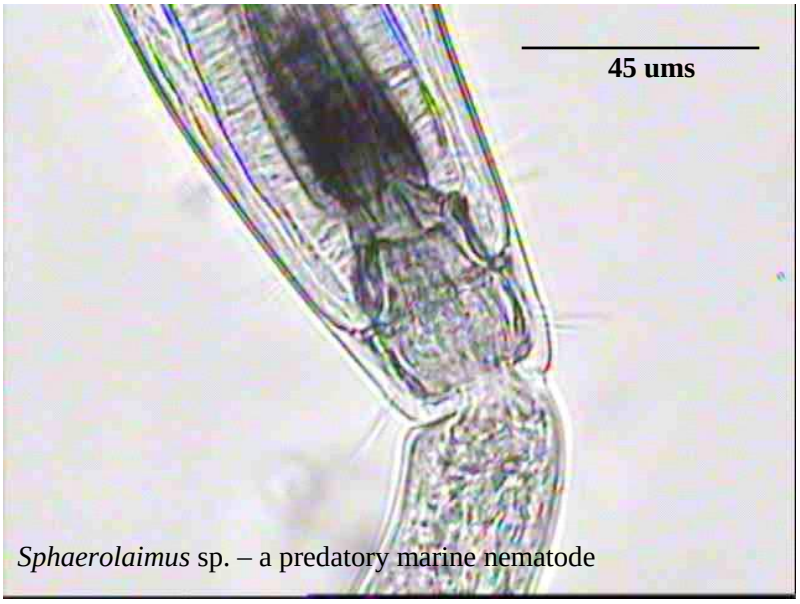
Final Grade ***100%***

Rubric for Critical Essay Grading

'A' level work	**'B' level work**	**'C' level work**	**'F' level work**
Introduction is very comprehensive, including 8+ refs. and provides clear outline of the essay	Introduction with less than 8 references and an outline of the essay	Introduction with few refs. with only a vague outline of essay	Introduction is confusing, no refs. and no outline of essay
A logical, clear argument describing the adaptation/s with clear referencing. Includes novel ideas regarding how the adaptation helps the animal in nature	A logical, clear argument describing the adaptation/s with clear referencing	A solid argument describing the adaption/s but could be more clearly written	A very confused, poorly written argument with little to no referencing
A short, well-written conclusion that ties all the points together and does not introduce new ideas	A well-written conclusion that ties all the points together but includes new ideas	A solid, if lengthy conclusion that attempts to tie points together but includes new ideas	A very muddled, lengthy conclusion
At least 8 APA style references in text and citations list	Between 5-8 APA style references in text and citations list	Less than 4 APA style references with errors in citation in text and citations list	Less than 2 APA style references with many errors
Grammatically correct, spelling correct, correct scientific usage, species and genus names italicized	A few errors in spelling, grammar and scientific usage	Numerous errors in spelling, grammar and scientific usage	Many errors

Appendix B – Example of Organism Fact Sheet Format
Name of Student: Henrietta Snail
Organism: Domain Eukarya, Kingdom Animalia, Phylum Nematoda, Class Adenophorea, Order Monhysterida, Family Sphaerolaimidae, Genus *Sphaerolaimus*, Species sp. Not yet described (free-living marine nematode)

- External structure: elongated cylindrical worms 1-2mm long; 'tube-in-a-tube' outer cuticle and inner complete digestive tract; blunter head end and pointed tail
- Feeding: predator, preys on other nematodes (see photo below)
- Internal structure: longitudinal muscles below cuticle, no circular muscles; complete digestive tract divided into buccal cavity, muscular esophagus, intestine and rectum; pseudocoelom, caudal gland
- Sense organs: distinct cephalization comprising: cephalic setae, chemosensory amphids, ocelli in some species, circumpharyngeal nerve ring
- Reproduction/Life history: separate sexes, internal fertilization following copulation, direct development with 4 juvenile stages, mature gonads/sex structures only in adult
- General ecology: found in surface oxic marine sediments, prefers siltier estuarine sediments



Sphaerolaimus sp. – a predatory marine nematode

- References: Platt H.M. and R.M. Warwick, 1988. Free-Living Marine Nematodes – Part II British Chromadorids, Synopses of the British Fauna, D.M. Kermack and R.S.K. Barnes (Eds.). E.J. Brill/Dr W. Backhuys. Leiden. 502p

Appendix C Earth Day Poster Format

Your poster will be a professionally laid out poster that includes the following:

- The full title with your name, university name and poster event and date. For example "The Impact of Increasing Sea Temperatures on Coral Bleaching; Ryan Fisher, Salem State University, Earth Day Poster Competition, 9th April 2012"
- Provide an introduction, body (where you synthesize the issue) and conclusion where you sum up and include a personal prognosis based on your research.
- Ensure you have approximately 50% succinct bullet point text slides and 50% images and or figures.
- Ensure the bullets have APA style citations
- Include a full reference list APA style
- Ensure that your poster has been thoroughly checked for plagiarism from the internet.
- **To win a prize in this competition and to get a good grade, your poster needs to be thoughtful, professional and creative.**