Biol 322: BIOLOGY OF MARINE INVERTEBRATES

Jan - Apr 2018 CRN 20335

Lectures: COR A120 Mon & Thu 11:30-12:50 **Laboratory:** Petch 109

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office hour Fri 1:30pm - 2:30 pm or by arranged appointment
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LECTURE: This course explores how selected groups of marine invertebrates have responded to challenges imposed by diverse marine environments over the evolutionary history of life on this planet. The result has been an explosion of often ingenious strategies for survival and successful reproduction. Lecture material is organized under themes of adaptation, such as: defensive strategies including transparency and bioluminescence, musculo-skeletal systems including provisions for autotomy, feeding systems, symbioses, reproductive biology, and selected physiological adaptations. A general overview of each theme is given, but the emphasis is on selected studies from the primary research literature. An introductory course in Invertebrate Biology (i.e. Biol. 321 or course equivalent) is a required prerequisite.

Biology 322 does not use a published textbook, although a general Invertebrate Biology textbook will be a valuable reference. In lieu of a textbook, notes supplementing the lecture material will be available on the CourseSpaces site for Biol 322. **However, all material presented in lecture is examinable.**

LABORATORY: The lab emphasizes observations on form, function, and behaviour of live animals. Morphological studies will involve dissections of heavily anaesthetized animals; only species that are very abundant in coastal waters around southern Vancouver Island will be used for this purpose. The lab manual for Biol 322 is available for purchase from the UVic bookstore. Labs begin Jan 10-12 in Petch 109. **It is essential that you attend your 1st lab session to remain registered in the course.**

In brief, the lab will involve four components:

1) **Discussion Groups.** Groups of 4-5 students will discuss a research paper. Each group will submit a single report of written answers to questions about the paper. Student grades will be based on the best 3 of 4 reports. **(marks: 3x3% = 9%)**
2) **Lab Notebook.** Observations made in the laboratory on the functional morphology and behaviour of various marine invertebrates will be recorded in a lab notebook. The notebook will be submitted for grading at the end of the last lab. **(marks: 18%)**
3) **Comparative Anatomical Study.** Students will work in groups of two to study the comparative structure & function of homologous structures in two invertebrates related at a taxonomic rank below the level of phylum. Each student will submit a 'proposal' (marks: 3%), which will outline their intended project, and then a formal report (marks: 17%) after both dissections have been completed. **(total marks: 20%)**
4) **SEM Project.** Students will work in groups of 2-3 to prepare an invertebrate 'hard part' for study using the scanning electron microscope. During the last lab period, each group will give a presentation (~10 min) describing the results to other students in the lab section. **(marks: 3%)**

Materials for lab:

1. Lab Manual – available for purchase from the UVic Bookstore.
2. Lab Notebook. Soft or hard cover notebook; lined or blank paper. Binders or file folders containing loose pages are unacceptable.
3. Dissecting Kit. Purchase from the UVic Bookstore; should include fine forceps.

Discussion Groups

Discussion groups can be an effective way of developing and practicing critical thinking skills. You will be assigned to a discussion group consisting of 4 individuals. The first 45 minutes of four lab period will be devoted to a group discussion of an assigned research paper. A link to a pdf copy of this paper from the UVic libraries will be available from the CourseSpaces site for Biol 322. You must read this paper **prior** to your lab and bring it to lab as a hard copy or a digital copy on your laptop or other device. Discussion will focus on assigned questions and your group's responses to these questions will be submitted as a single report (no more than 2 pages) compiled by a designated secretary. The secretary's job will rotate among group members. **Due dates for each Discussion Group Report are given in the Lecture & Lab Schedule.**

GRADING:

Lecture:	Midterm Exam – **THURSDAY FEB 8, 2018** (lectures 1-10 inclusive)	15%
	Final Exam (emphasis on material since Midterm Exam)	35%
	TOTAL LECTURE:	**50%**
Lab:	Discussion Group Reports	9%
	Anatomical Study Proposal (due at start of lab section Jan 24-26)	3%
	Anatomical Study Report (due at start of lab section Mar 14-16)	17%
	Lab Notebooks (due Mar 21-23 at end of lab period)	18%
	Presentation of SEM project results (Apr 4-6)	3%
	TOTAL LAB:	**50%**

- **Late laboratory assignments without a valid excuse will be deducted 10% per day late**
- **If the midterm lecture exam is missed with a valid excuse, the final grade will be calculated by proportional averaging of all other grades.**
- **You must receive a passing grade in the laboratory of Biol 322 in order to be allowed to write the final lecture exam of this course.**

Marks will be converted to letter grades according to the following table:

A+	90 – 100%	B+	77 - 79%	C+	65 - 69%
A	85 – 89%	B	73 - 76%	C	60 - 64%
A-	80 – 84%	B-	70 - 72%	D	50 - 59%

Grades will be rounded-off to the nearest whole number percentile (xx.5 will be rounded up)

No supplemental exams are offered in the Biology Department

Please note that the final exam period for spring term 2018 extends from Mon Apr 9 to Tue Apr 24, 2018. Do not make travel plans until after the final exam timetable has been posted!

Biology 322 – 2018 Biology of Marine Invertebrates – Lecture and Laboratory Schedule

DATE	LECT. NO.	LECTURE TOPIC	LAB EXERCISES & DISCUSSION GROUPS
Thu Jan 04	1	Introduction to course; begin suspension feeding	---
Mon Jan 08	2	Nutrition – suspension feeding	#1 Suspension Feeding – I **(Discussion #1)** Choose partner & animals for Comp. Anatomy Project
Thu Jan11	3	Nutrition – uptake dissolved organic matter	---
Mon Jan 15	4	Nutrition – animal-bacterial symbioses	#2 Suspension Feeding – II **Group report for Discussion #1 due** Final decision on animals for Comp. Anatomy Project Choose partner(s) and specimen for SEM Project
Thu Jan 18	5	Nutrition – animal-bacterial symbioses; sulfide tolerance	---
Mon Jan 22	6	Nutrition – animal-algal symbioses	#3 Symbioses **(Discussion #2)** Prepare SEM specimens **Proposal for Comparative Anatomy Project due**
Thu Jan 25	7	Nutrition – animal-algal symbioses; UV tolerance	---
Mon Jan 29	8	Musculoskeletal systems – isometry and allometry	#4 Size and Shape **(Discussion #3)** **Group report for Discussion #2 due**
Thu Feb 01	9	Musculoskeletal systems – skeletal and muscle materials	---
Mon Feb 05	10	Musculoskeletal systems – rigid skeletons	#5 Comparative Anatomy Project – study animal #1
Thu Feb 08		**MIDTERM LECT. EXAM – lectures 1-10 inclusive**	---
Feb 12-16		**READING BREAK**	**READING BREAK**
Mon Feb 19	11	Musculoskeletal systems – hydrostatic skeletons	#6 Comparative Anatomy Project – study animal #2 **Group report for Discussion #3 due**
Thu Feb 22	12	Musculoskeletal systems – pliable skeletons	---
Mon Feb 26	13	Defense – structural defenses	#7 Mount SEM specimens on stubs **(Discussion #4)** Sign-up for SEM appointments in EM Lab (Cun 065)
Thu Mar 01	14	Defense – chemical defenses	---
Mon Mar 05	15	Defense – behavioural defenses	#8 Muscle and Skeletal Systems SEM imaging appointments **Group report for Discussion #4 due**
Thu Mar 08	16	Defense – induced defenses	---
Mon Mar 12	17	Biomineralization	#9 Biomineralization **Anatomical project reports due at beginning of lab**
Thu Mar 15	18	Biomineralization & ocean acidification	---
Mon Mar 19	19	Reproduction – external & internal fertilization	#10 Reproduction & Development **Lab notebooks handed-in at end of lab**
Thu Mar 22	20	Reproduction – protection & provisioning of offspring	---
Mon Mar 26	21	Reproduction – settlement & metamorphosis	--- Mar 30, 2018 is Good Friday – NO LABS
Thu Mar 29	22	Reproduction – dispersal & delay of metamorphosis	---
Mon Apr 02		EASTER MONDAY	#11 **SEM project presentations**
Thu Apr 05	23	Marine Conservation Issues	