Invertebrate diversity

Lecture: Tuesday & Thursday, 10:15-11:30 (Room CC-101)
Lab: Alternate Wednesdays or Thursdays, 13:30 – 17:30 (Room SP-380-5)
Website accessible on moodle via your portal.

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The animal kingdom spans an extraordinary diversity of forms, including specializations that are often bizarre, and its innumerable species occupy all conceivable ecological niches. Comparative anatomy, embryology and molecular biology show a striking unity among animals, suggesting that this diversity is made up of variations on a series of basic themes, some of them common to all living organisms.

This course is intended as an introduction to the common origins and diversification of invertebrates and to their functional systems. We will examine the evolutionary processes at work through time that underlie animal life as we know it. The course will involve lectures including active learning exercises, online quizzes, labs with group work, field trips within Montreal and independent reading and viewing of materials in the library. Students must keep up with reading and assignments during term.

Grading scheme

Oral presentation: 10% (or 10%)
Portrait of a minor taxon. To be done in groups.

Quizzes: 10% (or 10%)
Do at-home preparation and online assignments before class and participate in in-class active learning exercises. Must keep up during term.

Lab notes: 10% (or 10%)
Detailed record of lab work, due at the end of the lab. The compost lab will be graded for everyone, and three of the other five labs will be selected randomly for grading. Mark includes lab participation.

Lab exam: 20% (or 0%)
Identification of organisms & structures seen in the lab. April 2nd.

Midterm exam: 15% (or 0%)
Essay and short-answer questions on the material covered in lectures and labs. March 5th.

Final exam: 35% (or remaining points)
Essay questions demanding reflection and synthesis on all material covered.

For the final grade, you can omit either the midterm or the lab exam (e.g. if you miss one, for whatever reason) but not both.

Resources

Textbook:

- Pechenik, J. 2014. Biology of the Invertebrates, Seventh Edition.

Other assigned viewing:

- PBS. 2002. The Shape of Life, documentary miniseries (DVDs). *Explosion of Life; Origins; Life on the Move; Bones, Brawn & Brains; The First Hunter; Ultimate Animal; The Conquerors; Survival Game.*
- Russel, BJ. 1976. Invertebrates video series: Coelenterates, Flatworms, Molluscs, Annelids, Nematodes, Arthropods, Echinoderms. Biomedia Associates. (DVD)
- David Attenborough. 2005. Life in the Undergrowth, BBC documentary miniseries (DVD). *Invasion of Land, Taking to the Air, Supersocieties*.
- Marty Stouffer. 2008. A Multitude of Mollusks. Wild America, Season 4, episode 4 (DVD).

Preparation for each lecture:
Red indicates readings in the textbook, green shows videos to be viewed (available through the library) and blue are assignments due. There will be an assignment on moodle based on these materials to complete before the lecture.

1: Jan. 8 – diversity
Jan. 9 & 10 – Review of invertebrate diversity lab handout
Jan. 10 origins BI 7-17 & Explosion of Life

2: Jan. 15 – sponges BI 77-89 & Origins
Jan. 17 – cnidarians BI 99-126

3: Jan. 22– platyhelminthes BI 147-169
Jan. 23 & 24 – Anatomy and lifestyle: worms lab handout & BI 325-328
Jan. 24 – annelids BI 295-325

4: Jan. 29 – nematodes BI 431-445
Jan. 31 – molluscs I BI 215-255

5: Feb. 5 – molluscs II: BI 255-264 & Multitude of Mollusks
Feb. 6 & 7 – Body plan variations: molluscs lab handout & BI 265-271
Feb. 7 – arthropods I: crustaceans 373-392

6: Feb. 12 – arthropods II: on land BI 350-373 & Invasion of Land
Feb. 14 – echinoderms BI 497-518

7: Feb. 19 – chordates BI 539-551 & Bones, brawn, brain
Feb. 20 & Feb. 21 – Arthropods handout & BI 341-350 & 392-397
Feb. 21 – echinoderm anatomy BI 518-520

8: Mar. 5 – midterm exam
Mar. 7 – insectarium visit Taking to the Air & Supersocieties

9: Mar. 12 – minor taxa I Life on the move
Mar. 13 & 14 – Compost biodiversity lab handout
Mar. 14 – Physiology I: osmoregulation and excretion BI 2-6

10: Mar. 19 – minor taxa II The conquerors & Redpath museum
Mar. 21 – Physiology II: respiration Survival game

11: Mar. 26 – Physiology III: reproduction & development BI 555-580
Mar. 27-28 - Lifecycles lab handout
Mar. 28 – minor taxa III Ultimate animal

12: Apr. 2 – Lab exam
Apr. 4 – Physiology IV: nutrition & feeding The first hunter

13: Apr. 9 - phylogeny BI 18-30
Apr. 11 – review Biomedia videos