

# Biol 4182 – Ecological Developmental Biology

Instructor: PZ Myers  
Office: 2390 Science  
Office phone: x6343  
Office hours: MW1-3, or by appointment  
Class meeting: T, Th 8:00-9:40, Sci 2200

**Catalog course description:** Integrates the fields of ecology, development, and evolution. Topics covered include plasticity, environmental interactions in embryology, and the medical consequences of teratogens and other developmental perturbations.

## Textbooks

Required texts:

*Ecological Developmental Biology*, 2nd ed., by SF Gilbert and D Epel.  
*The Triple Helix*, by R Lewontin.

Supplemental texts:

(Do not buy these! I will provide links to access relevant portions of these books online)

*Developmental Biology*, 6th ed., by SF Gilbert.  
*Langman's Medical Embryology*, by TW Sadler.

I will also be uploading research papers to the Moodle site.

## Outline

### A crash course in basic developmental biology

Week 1: Nature vs. Nurture? Or Nature *and* Nurture?

Polarity in the embryo.

Gastrulation and the Organizer

Week 2: Neurulation and Neural Crest

Limb development

Craniofacial development

Week 3: Student presentations on stages of human development (5%)

In-class discussion and quiz on *The Triple Helix* (10%)

### The environmental regulation of development: Gilbert & Epel

Please note: There will additional readings for each week posted on the Moodle site

Week 4: Plasticity. Chapter 4

Week 5: Environmental Epigenetics. Chapter 5 (critical paper analysis — 5%)

Week 6: Developmental Symbiosis. Chapter 6 (presentation proposal due — 5%)

Week 7: Developmental Physiology. Chapter 7

Week 8: Oral Midterm (20%). Presentation outline due. (5%)

Spring Break, 13-17 March

Week 9: Teratogenesis, Endocrine disruption. Chapters 5 & 6

Week 10: Adult Diseases, and Cancer. Chapters 7 & 8

### Selected topics in the field

Week 11-14: Student presentations on relevant topics of interest (25%) (topic summary due — 10%)

Week 15: EvoDevo, Developmental Regulatory Genes, Chapter 10

This is a completely new course, and this schedule is extremely tentative and subject to adjustment.

I'm also willing to accommodate extensions of topics that are of particular interest to the class.

(Colored text = assignments and weight.)

## Grading

Your final grade will be determined by participation, performance in oral exams, two presentations (one very short, another for half a class hour), and written essays that build up to your final presentation. There will be no final exam.

15% of your grade will be derived from simply showing up and being responsive (you don't get credit if you show up and fall asleep at your desk.)

5% will come from a 5-minute presentation on an assigned topic in human embryology.

10% will be based on participation in an open discussion of The Triple Helix.

20% will be based on a one-on-one oral exam with me at the midterm.

25% will be from written assignments over the course of the term.

25% will be determined by your final presentation.

Letter grades will be based on percent of the total possible: A = 90%+, B = 80%+, C = 70%, D = 50 - 68%, N = 50 % or less. You cannot pass this course if your mean score is below 50%.

Here is the University of Minnesota policy on grading standards:

A: Represents achievement that is outstanding relative to the level necessary to meet course requirements.

B: Represents achievement that is significantly above the level necessary to meet course requirements.

C: Represents achievement that meets the course requirements in every respect.

D: Represents achievement that is worthy of credit even though it fails to meet fully the course requirements.

S: Represents achievement that is satisfactory, which is equivalent to a C- or better. F (or N):

Represents failure (or no credit) and signifies that the work was either (1)

completed but at a level of achievement that is not worthy of credit, or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an I (see also "I" below).

I (Incomplete): Assigned at the discretion of the instructor when, due to extraordinary circumstances, e.g. hospitalization, a student is prevented from completing the work of the course on time. Requires a written agreement between the instructor and student.

Make-up policy: I will try to reschedule a missed oral exam, and to arrange the presentation schedule, to accommodate conflicts. These will have to be done within a few days of the missed opportunity, however, or you will lose the credit.

## Standard policy requirements

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### Workload Expectations

For undergraduate courses, one credit is defined as equivalent to an average of three hours of learning effort per week (over a full semester) necessary for an average student to achieve an average grade (C) in the course. For example, a student taking a four credit course that meets for four hours a week should expect to spend an additional eight hours a week on course work outside the classroom— or more for a higher grade.

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## Senate student academic workload policy

University of Minnesota Senate Policy on Academic Credit Hours:

One semester credit is normally to represent, for the average University of Minnesota undergraduate student, three hours of academic work per week (including lectures, laboratories, recitations, field work, and study) averaged over the term in order to complete the work of the course. It is expected that the academic work required of graduate and professional students will exceed three hours per credit per week. Professional norms and the nature of course activity (e.g., clinical experiences, some laboratory work, and some studio activities) may require more than three hours of work per week per credit hour, with college approval and appropriate notification to the students. These “workload” expectations relate only to completion of the course work; greater effort is likely required to earn high grades.

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## Students with disabilities

It is my practice as well as University policy to provide reasonable accommodations to students with disabilities. Course materials are available in alternative formats to people with disabilities upon request. Please contact the Disability Services office, 589-6163, Room 362 Briggs Library, to discuss accommodation needs.

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## Classroom Conduct

A classroom is a forum founded on respect and courtesy among all participants; individuals who are not willing to conduct themselves accordingly will be dismissed; those whose behavior violates the University Student Conduct Code will be subject to disciplinary action. Recording equipment is allowed provided that you let me know that you will be using it. Cell phones should be off in the classroom.

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## Academic Integrity

All tests (including online quizzes) are strictly individual work, without consulting outside resources unless explicitly specified in the test.

The UMM Biology program has a strong tradition of academic integrity (I have never had a problem with this on biology exams at UMM), and any infringement on this would be grounds for immediate dismissal from and failure in the course.

University Statement: Scholastic dishonesty means plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering forging, or misusing a University academic record; or fabricating or falsifying data, research procedures, or data analysis.

In this course, a student responsible for scholastic dishonesty can be assigned a penalty up to and including an "F" or "N" for the course. If you have any questions regarding the expectations for a specific assignment or exam, ask.

These descriptions of plagiarism are taken from Pechenik (2004: A Short Guide to Writing about Biology; the emphasis is in the original): “Submitting anyone else’s work under your own name is plagiarism, even if you alter some words. Presenting someone else’s ideas as your own is also plagiarism.... Plagiarism is theft. It is one of the most serious offenses that can be committed in

academia, where original thought is the major product of one's work – often months, sometimes years of physical and mental work." Pechenik follows this with suggestions of how to take notes that will prevent unintentional plagiarism.

Plagiarism of any sort or source will result in penalties that may range from no credit on the report to failing the course.

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## Sexual Harassment

University policy prohibits sexual harassment as defined by the University of Minnesota Regents' policy: <http://policy.umn.edu/hr/sexualharassment>