This course will introduce advanced topics in genetics in relation to the primary scientific literature.

Suggested textbook: None, the class will discuss all topics in relation to the primary scientific literature. Notes for the class and the papers to be discussed will be found on Sakai and/or sent via the UD dropbox.

Grading
50% 3 non-cumulative hourly exams on course material
40% 2 term papers in “Minigrant proposal” format
10% written reviews of prior year’s minigrants

Prerequisites: BISC 207, BISC 208, or equivalent; BISC 403 or equivalent, BISC 401 or equivalent (a good working understanding of molecular biology and genetics is expected including an appreciation for research methods used in molecular and cellular biology). If you have any doubts about your preparation please discuss this with Dr. Erica Selva the first week of class.

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Course policies:

Attendance: Attendance will not be taken and is not figured into the final grade. However, students are responsible for all material covered in class (which may or may not be found in the materials posted on Sakai).

EXAMS: Three non-cumulative hourly exams will be given to test your retention and understanding of the material presented in lecture. All exam questions are either essay or short answer format, multiple choice questions will not be given. Make-up exams will only be given under the most unusual circumstances. You have a better chance of being granted a make-up exam if you contact Erica Selva in writing at least two days ahead of the exam to be missed.

Mini Grant Proposals: Mini-grant proposals are five page papers written in the format of a National Institutes of Health research grant. The sections are Introduction (a description of the current knowledge in the field of your chosen question), hypothesis/specific aims (what do you think the answer is to an unanswered question in developmental biology), research design (how would you test your hypothesis and what do the possible outcomes of the proposed experiments mean). Remember, the point of a real NIH grant proposal is to ask the government for hundreds of thousands of dollars to do research.

WARNING!!!! You may see the words “five page paper” and think that this will be no big deal. However, you need to come up with an original idea based upon your reading of recent primary scientific literature. For a real NIH grant proposal, scientists will spend at least four 70 hour weeks preparing an application based on science that they are expert. You will not be able to start on your proposal the night before it is due and expect to do a passing job. In order to help the procrastinators among you, We are requiring that you choose your paper topic and discuss it with the appropriate course instructor at least ten days before it is due (see course schedule for deadline). Failure to do this will result in the loss of an entire letter grade from the completed paper. Late papers will not be accepted. If you have a conflict on the day a paper is due, we expect to receive it EARLY.

Now that we have gotten your attention, we appreciate that these papers are a new task for most of you. We will be happy to discuss your idea with you and help you put it together in the correct form if you are uncertain what is expected. However, it is your responsibility to contact the course instructors with your problems. If we do not hear from you, we will assume that you understand this assignment fully.

Peer review exercise: Four minigrants written as student assignments in prior years will be provided to the class. Each student will be expected to read each of these proposals, assign a grade (0-100) and write a one-two paragraph justification for the grade assigned. Students are allowed to discuss the quality of these proposals among themselves, however, each written critique must be the independent work of each student. Note that these critiques should be written using professional language that would be appropriate to give to the original proposal author. It is fine (and expected) to point out specific weaknesses, however your grade on this assignment will be reduced if the comments are snide or do not give specific suggestions for
improving the proposal. Write the kind of constructive criticisms you would like to receive to make your work better. Also, remember that work can be scientifically important even if it is not directly medically relevant.

**Academic dishonesty/plagiarism:** It is the student’s responsibility to ensure that all work for this class is their own (you may discuss possible paper topics among yourselves however, two students will not be allowed to write on the same topic). We will prosecute any and all instances of cheating to the fullest extent allowable by the university.

Copying someone else's writing and pretending that it is yours is a serious violation of the University's [Code of Conduct](#). If you copy text from a book, article, web page, or other source, or from another student or former student, you will receive a 0 for the assignment. If the copying is particularly extensive or egregious, you will receive a harsher penalty, up to an F for the course. Further, your minigrant proposal should frame and propose how to solve a currently unanswered scientific question. It is not acceptable to take a recently published paper and recast it as a minigrant. This is cheating and will result in a 0 for the assignment and in egregious situations, an F in the course. In this case, you may also be required to take university mandating courses on appropriate academic conduct to remain a student at UD.

To illustrate the difference between plagiarism and acceptable paraphrasing, here's a passage from Hudson et al. (1987):

The presence of a balanced polymorphism in the coding region of Adh could explain the relatively high level of polymorphism observed in that region. The existence of a balanced polymorphism at a single site can lead to higher levels of neutral polymorphism at linked sites (Strobeck 1983). The reason this can occur is that during the time that the balanced polymorphism is maintained by selection, new mutations will tend to accumulate in the region tightly linked to the selected site.

Copying these words exactly is plagiarism, even if you put "(Hudson et al. 1987)" at the end. It's also plagiarism if you just change a few words, like this:

A balanced polymorphism in the coding region of Adh could explain the high level of polymorphism in that region. The existence of a balanced polymorphism at a single site can cause higher levels of neutral polymorphism at linked sites (Strobeck 1983). This is because during the time that the balanced polymorphism is maintained by selection, new mutations will accumulate in the region tightly linked to the selected site (Hudson et al. 1987).

Instead of copying or trying to rewrite a passage, you should paraphrase it, summarizing the information in your own words:

There is an area around an amino acid polymorphism in Adh that has a relatively high level of silent polymorphism. This may be caused by balancing selection (Hudson et al. 1987).

**NOTE:** All statements of fact must be substantiated by a reference in correct format, preferably from the primary scientific literature. Failure to reference your sources is also plagiarism. (For instance, this statement on plagiarism is liberally lifted from John McDonald’s course syllabus with permission :).
Direct quotes

In papers in other fields, such as English or history, it is common to use direct quotes, putting phrases or sentences from sources in quotation marks. This is because the exact words are important; if you're writing a paper on "Entomological ambiguities in Kafka's *Metamorphosis,*" it's important to quote exactly what Kafka wrote about Gregor Samsa's carapace. As long as you cite the source correctly, using quotes in quotation marks is not plagiarism.

In scientific writing, however, we rarely use direct quotes. Partly, this is just a cultural tradition; partly, it's because when scientists cite another paper, it's because they're writing about the information in the paper, and the exact words used to convey that information are not important. You may use a quotation or two, if you come across a particularly pithy statement of an important concept, but you will get points off for excessive use of direct quotes.

**Disabilities:** Students suspected of having a learning disability must seek an accommodation from the office of academic enrichment [http://www.aec.udel.edu/LD_ADHD_students.html](http://www.aec.udel.edu/LD_ADHD_students.html).
Course Schedule

Reading assignments will be given at every class period

February 8- (1) Bacterial genetics, Boyd

February 10- (2) Bacterial genetics, Boyd

February 15- (3) Genetic screens and genetic organisms Selva

February 17- (4) Genetic screens and genetic organisms Selva

February 22- (5) Cloning vectors primer, purpose and use Selva

February 24- (6) yeast genetics, Selva

March 1 (7) yeast genetics, Kruckeberg

March 3- (8) Exam one

March 8- (9) Grant proposals/set up of calibrated peer review exercise Selva

March 10–(10) Drosophila genetics, Selva

March 15- (11) Drosophila genetics, Selva Calibrated peer reviews due

March 17- (12) Calibrated peer review analysis Selva

March 22- (13) Mouse genetics Duncan TOPICS FOR PAPER ONE DUE

March 24- (14) Mouse genetics Duncan

SPRING BREAK (March 29 and 31)

April 5- (15) Mouse genetics Duncan

April 7- (16) Transgenic agricultural animals PAPER one due

April 12- (17) Genetics and evolution Duncan

April 14- (18) Genetics and evolution, Duncan

April 19- (19) Exam 2
April 21 (20) Human genomics Hobson

April 26 (21) Human genomics Hobson

April 28 (22) Cancer genetics Boman

May 3 (23) Cancer genetics Boman

May 5 (24) Human genetics Schanen MINI GRANT PROPOSAL TOPICS DUE!

May 10 (25) Human genetics Schanen

May 12 (26) Human genetics Schanen

May 17 LAST CLASS, last exam

LAST PAPER DUE Monday MAY 24th at 5 pm.