# BIOLOGY 334 CELL BIOLOGY, 2008

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**Textbook**: Pollard & Earnshaw, *Cell Biology*, **Second Edition**, Saunders, 2008

**Lectures**: Wilson 214, Tu and Th, 10 - 11:30 am

**Streaming (Lecture videos)**:
http://streaming.wustl.edu/courses/lectures/pages/bio334.html
Logon/User name: bio334
Course Password: g3nMez (case-sensitive)

**Course Website:** http://www.nslc.wustl.edu/courses/Bio334/bio334.html
User and password same as for Streaming.
Powerpoints for next-day's lecture posted by 5 pm on Mondays and Wednesdays. If you wish, print out for class.
Study Guides posted each Monday to cover prior week.

| | LECTURE | TEXT READING (Chpt) |
|---|---|---|
| Tu Jan 13 | Introduction, origin and evolution of life | 1, 2 |
| Th Jan 15 | Reduction and emergence<br>Molecular structures | <br>3 (p. 46-52 as review)<br>4 (read, not tested) |
| Tu Jan 20 | Macromolecular assembly<br>Research strategies | 5, 6 |
| Th Jan 22 | Membrane structure, pumps | 7, 8 |
| Tu Jan 27 | **QUIZ** on Jan13- Jan 22 material<br>Membrane carriers, channels | <br>9, 10 |
| Th Jan 29 | Membrane physiology<br>Structure of nucleus | 11 (→ p. 185)<br>14 (→ p. 240) |
| Tu Feb 3 | Nuclear trafficking<br><br>Mitochondrial trafficking | 14 (p. 240-47)<br>17 (p. 306-10); 18 (p. 315-20); 19 (p. 331-37) |
| Th Feb 5 | Biosynthesis in ER and Golgi | 20 |
| Tu Feb 10 | **QUIZ** on Jan 27 - Feb 5 material<br>Vesicular trafficking, ER <--> Golgi | <br>21 |

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|---|---|---|
| Th Feb 12 | Trans-Golgi, lysosome biogenesis, endocytosis | 22 |
| Tu Feb 17 | **IN-CLASS TEST #1 on material through Feb 5** | |
| Th Feb 19 | Endocytosis and protein degradation | 23 |
| Tu Feb 24 | **QUIZ** on Feb 10 - Feb 19 material<br>Cholesterol, plasma membrane receptors | 24 |
| Th Feb 26 | Protein hardware for signaling | 25 |
| Tu Mar 3 | Second messengers | 26 |
| Th Mar 5 | Integration of signals | 27 (→ p. 508) |

**SPRING BREAK (note: QUIZ when you return!)**

| | | |
|---|---|---|
| Tu Mar 17 | **QUIZ** on Feb 24 - Mar 5 material<br>Integration of signals (cont.) | |
| Th Mar 19 | Cells and molecules of the extracellular matrix | 28, 29, 32 (p. 593-95) |
| Tu Mar 24 | **QUIZ** on Mar 17 - Mar 19 material<br>Cellular adhesion, intercellular junctions | 30, 31 |
| Th Mar 26 | Overview of cytoskeleton, actin | 33 |
| Tu Mar 31 | **IN-CLASS TEST #2 on Feb 10-Mar 19 material** | |
| Th Apr 2 | Microtubules, intermediate filaments | 34, 35 |
| Tu Apr 7 | **QUIZ** on Mar 24 - Apr 2 material<br>Motors, intracellular motility | 36, 37 |
| Th Apr 9 | Cellular motility, muscles | 38, 39 |
| Tu Apr 14 | Cell cycle, G1 phase | 40, 41 |
| Th Apr 16 | G2 phase and entry into mitosis | 43 |
| Tu Apr 21 | **QUIZ** on Apr 7 - Apr 16 material<br>Mitosis | 44 |

Th Apr 23 **MAKE-UP QUIZ** on Apr 16- Apr 21 material
Programmed cell death 46

**FINAL EXAM**: April 30, 10:30am-12:30pm

## Biology 334: Course Administration

Lectures

The textbook covers, elegantly IMO, the material important to know about cell biology. I will therefore be lecturing in close interface with the text, using projected images of the text figures to explain concepts. I will also insert, when available, new material that updates what was understood when the text was written.

The lectures are videotaped and streamed (access information at the start of the lecture schedule). Having lived with taping for several years, it's become clear that some students prefer to come to class while others prefer to learn the material via streaming, and I've noticed no obvious difference in test performance between the two groups. Those of you who come to class avoid falling behind, and you garner the opportunity to put up your hand to ask questions, and of course I love having you in the room. But if mostly-streaming works out better for you, there it is!

Textbook

Except where indicated in the syllabus, the textbook reading is required. This does not mean that you are responsible for every fact in the reading; there are few persons on the planet who know by heart every fact in that book, including me. It does mean, however, that I want you to read all the assignments, since reading about several additional examples of a given phenomenon will greatly enhance your understanding of the phenomenon. That said, you will be **tested** on **the material that I cover in lecture**. We will not cover most of the book's information on nucleic acids, bacteria, or plants, but you are warmly encouraged to read these sections anyway!

Study Guides and Questions

Each Monday I will post "Study Guides" on the website that indicate the level at which I want you to master the reading and the lectures. These may not address all your questions, and **you are encouraged to email me (ursula@biology) with any questions you might have**, either about the material itself, or what-should-I- know-about-X, or I'm interested in X, how can I find out more about it? I learn a lot from such emails and they are not at all an imposition. If a query addresses something of general interest or a persistent confusion, I'll forward it (removing your name) and my response to the whole class.

Quizzes

On the Tuesdays designated with a **QUIZ** on the lecture schedule, there will be an in-class quiz from 10:07 - 10:17 before the start of the lecture. The quiz will have 4-5 short, easy questions on the lecture material of the prior 2 weeks or, in some cases, the

prior week to accommodate in-class test schedules; if you have attended/watched lectures regularly and kept up with the reading, they should present no difficulty. The quiz concept is introduced to counteract the temptation to restrict course attention to a last-minute blitz before each in-class test, a concept suggested by prior students in the course who succumbed to this temptation and regretted its consequences. **The numerical total of all your quiz grades will represent 10% of the final grade.** One optional **QUIZ MAKE-UP** will be given at the end of the semester to deal with an absence or to replace your lowest received quiz grade. **Otherwise, there are no make-up quizzes**.

Exams

There are 2 in-class tests and a final. The first in-class test (Feb. 17) covers lectures/reading through Feb. 5 (i.e. if I am behind or ahead of the printed schedule, whatever I've presented through the actual lecture on Feb 5, and attendant reading, is what will be covered on the first test); the second in-class test (March 31) covers lectures/reading starting from the Feb. 10 lecture through the actual March 19 lecture. Roughly 3/4 of the questions on the final exam cover lectures/reading from the last (third) sector of the course (i.e. post-March 19); roughly 1/4 of the questions review the course as a whole. There is, of course, the expectation that you retain cell-biology concepts, if not detailed facts, throughout the course (and hopefully in future years!). For example, a question on the second test may assume an understanding of material from the first third of the course even though there is not a specific question on that material.

Posted on the course website are the tests and model answers for the tests given in 2003 and 2005 -2008 (I was on sabbatical in 2004 and the course was taught by different instructors, so those tests are not posted because they are not predictive of the kinds of questions I ask). **I always make up new questions for tests**, so the old tests are for guidance. Many students report it helpful to take previous tests (delete the answers so you really have to think!) and to team up with others to discuss their answers and the course material. Let me know if you need to find study partners and I'll be glad to help fix you up.

In-class tests and quizzes are handed back with a numerical grade, and the class mean, median, and grade distributions are posted on the website along with model answers. Course letter grades are assigned after all numerical grades are summed and distributions are plotted in May.

Study Help

Three graduate student TAs are associated with Bio 334, with a particular TA associated with each third of the course as announced in class. Appointments for individual help can be arranged by calling or emailing the designated TA; phone numbers will be announced in class. If you should remain unclear about a topic after going over it with the TA, you are encouraged to see me during my office hours; if you can't make these, arrange an appointment by email. General review sessions will be held before each exam; time and place will be announced in class.

I'm also very open to having you come by during office hours, or by appointment if you can't make office hours, just to chat. Don't be shy!

Make-up Exams

A make-up for an in-class test can be taken only if a medical excuse, signed by a physician, is presented. I dislike being this rigid, but have tried a number of alternatives over the years and all have been abused. A make-up must be taken to avoid a zero, which will be included in calculating a student's grade, but because the make-up will be different from the test taken by the rest of the class, and therefore may be harder or easier, its score is not included in calculating a student's final grade; the grade will be calculated based on the in-class tests taken.

"Field Trip": Attending a Research Seminar in Cell Biology

A required component of Bio 334 includes the experience of attending a one-hour on-campus research seminar in cell biology. You may or may not follow (all of) the science being presented, but the idea is that at the least, you get a better sense than can be provided by lectures and the textbook as to what the biomedical research community is really like.

You can choose to attend any one of the seminars posted on the website, after which you are asked to send me an email (ursula@biology) describing what happened, generally in several paragraphs. I expect that you'll follow enough of the talk to be able to give a general overview of the seminar, and if you followed even some of the details, please outline what you learned. Should you get lost early on, then I'd like to hear about your impressions of the venue: what did you learn about the kinds of people who are doing this kind of science, the kinds of questions asked at the end, the energy (or possibly lack of energy!) in the room, the way the presenter fashioned her/his story? You are encouraged to include comments on this "sociology" parameter even if you able to report as well on the science.

You'll receive 15 points for attending and then writing this report; i.e. if I don't receive anything, your total in the course will be lowered by 15 points. If you send me a report that strikes me as rushed and shallow, I may ask you to give it a bit more attention before awarding the credit.

Final Grade

All 3 exams, plus the "field trip" grade, are included in averaging the final grade, the final exam having more points (133 vs. 100) since it is longer (2 hr) than the in-class tests (1.5 hr each). The aggregate quiz grades also contribute 10% of the final grade. After all letter grades are assigned, I look at the individual records of students given a $C^+$ or a $B^+$ whose numerical averages are "near the border." If one test score is clearly much lower than the other two, thereby bringing down the average, I usually award a $B^-$ or an $A^-$ grade to such students. For students in the D and F categories, I also look for patterns of marked improvement and may raise a grade if only one exam is responsible for the very low average. In general, however, you should expect that all 3 exam scores and all quiz scores will be included in your final grade, and study accordingly.