Biology 312
Cell and Molecular Biology
SPRING SEMESTER 2018

3 Credits
Instructors: Peter Fuerst and Scott Grieshaber

Peter Fuerst
Office: Room 145 Life Sciences Building
Office Hours: 8:30-9:30 MW

Scott Griesheiber
Office: Room: 133 Gibb Hall
Office Hours: 8:30-9:30 WM

Lecture: MWF 9:30-10:20; LSS 277

Suggested Textbook:
Cell and Molecular Biology (7th edition) by Gerald Karp (Other additions or other cell and molecular biology books or online resources may be substituted)

Tips for success in class:

Attend class! Bring a copy of the notes and annotate them as we go. The note set often includes extra material that can be helpful but is not necessarily core material. Posted note sets might change slightly, in which case we will note this on BB learn. Attending class will help you to sort this out and prevent you from getting overwhelmed with content. Read the text or use online resources and our office hours to help understand material that you are struggling with.

Try practice questions! We have included about 100 practice questions from last year on the site. Please feel free to make use of these. We actually will use some of these on our exams.

Posted in class sessions: Currently all sessions are posted from last year. These will likely be modified in some way and a new version will be posted before class. For example old sessions may have outdated material or may have references to last year such as career fairs.
# LECTURE OUTLINE

## Part I Building and Fueling a Cell

<table>
<thead>
<tr>
<th>Jan</th>
<th>Topic</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Introduction, Cells and Organelles (PF&amp; SG)</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Macromolecules (SG)</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>MLK Day No class</td>
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</tr>
<tr>
<td>17</td>
<td>Membrane structure (SG)</td>
<td></td>
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<tr>
<td>19</td>
<td>Membrane functions (SG)</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Cell environment: extracellular matrix (PGF)</td>
<td></td>
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<tr>
<td>24</td>
<td>Cell environment: cell adhesion and junctions (PGF)</td>
<td></td>
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<tr>
<td>26</td>
<td>Energetics (PGF)</td>
<td></td>
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<tr>
<td>29</td>
<td>Mitochondria: structure and TCA cycle (SG)</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Mitochondria: electron transport and ATP synthesis (SG)</td>
<td></td>
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</tbody>
</table>

## Part II Information Processing in the Cell

<table>
<thead>
<tr>
<th>Feb</th>
<th>Topic</th>
<th>Notes</th>
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<tbody>
<tr>
<td>02</td>
<td>Chloroplasts: structure and photosynthesis (SG)</td>
<td></td>
</tr>
<tr>
<td>05</td>
<td>Review for Exam I (SG and PGF)</td>
<td></td>
</tr>
<tr>
<td>07</td>
<td><strong>Exam 1</strong> (covers lecture and readings through February 02)</td>
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<tr>
<td>09</td>
<td>Transcription (SG)</td>
<td></td>
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<tr>
<td>12</td>
<td>mRNA processing (SG)</td>
<td></td>
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<tr>
<td>14</td>
<td>rRNA and tRNA processing (SG)</td>
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<tr>
<td>16</td>
<td>Translation (SG)</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>President's Day No class</td>
<td></td>
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<tr>
<td>21</td>
<td>Cell cycle: DNA replication (SG)</td>
<td></td>
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<tr>
<td>23</td>
<td>Cell cycle: DNA repair (PGF)</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Cell cycle: mitosis, cytokinesis (SG)</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Cell cycle: control (SG)</td>
<td></td>
</tr>
<tr>
<td>Mar</td>
<td>02</td>
<td>Cell cycle: meiosis (SG)</td>
</tr>
<tr>
<td>05</td>
<td>Cell cycle: apoptosis (SG)</td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>Review for Exam 2 (SG and PGF)</td>
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<tr>
<td>09</td>
<td><strong>Exam 2</strong> (covers lecture and readings through March 05)</td>
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### 12-16 Spring Break No class
Part III Cellular Movement

19  Cytoskeleton: microtubules (PGF)
21  Cytoskeleton: intermediate filaments and microfilaments (PGF)
23  Cilia and Flagella based movement (PGF)
26  Cytoskeleton: muscle and non-muscle motility (PGF)
28  Membrane systems: smooth and rough endoplasmic reticulum (PGF)
30  Membrane systems: Golgi complex (PGF)

Apr 02  Membrane systems: endo / exocytosis / lysosomes (PGF)
04  DNA structure and chromatin (SG)
06  Nuclear structure and transport (SG)

09  Review for Exam 3
11  Exam 3 (covers lecture and readings through April 06)

Part IV Regulation of Cellular Processes

13  Regulation of gene expression: transcription (PGF)
16  Regulation of gene expression: transcription (PGF)
18  Regulation of gene expression: translation / post-translation (PGF)
20  Cell communication: an overview (PGF)
23  Cell communication: G-protein coupled (PGF)
25  Cell communication: tyrosine phosphorylation (PGF)
27  Immune 1 (PGF)
30  Immune Response (PGF)

May 02  Signaling, behavior and development (PGF)
04  Review for Exam 4 (SG and PGF)

May 10

Friday, May 11 Exam IV (7:30 am – 9:30 AM) (Covers April 13-end of course)
Exams

There will be three exams (50 minutes) and a comprehensive final (120 minutes; 50% of the final exam will cover course material from the third hour exam).

The exams may be comprehensive; that is, they can cover materials from the beginning of the course.

- Exam questions will be based upon materials presented in lectures and assigned readings.
- All students will be required to take the final exam, and there will be no early finals given in this course.
- Correct spelling is important; incorrect spelling of an answer will result in a deduction of 25% of the worth of the question. Please draw neatly and clearly label all parts of an illustration.
- Exams may contain take-home questions
- Requests to regrade an exam are due in writing by 5 pm; three days after publishing the answer key (regrade requests submitted after this time will not be accepted). Summing errors can be corrected at any time.
Summary of your grade

<table>
<thead>
<tr>
<th>Points</th>
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<tbody>
<tr>
<td>Hour exams (4 / 250 points each)       1000</td>
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<tr>
<td>Final exam is exam 4</td>
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Total 1000

Exams are cumulative in the sense that what you have learnt previously that is a necessary foundation for later material will be fair game on exams.

Grading

Grades will be based solely upon the percentage of total points you have accumulated.

90% or greater of the total accumulated points = A
80% = B
70% = C
60% = D
Below 60% = F

Excused Absence

An absence from class is excused if it is due to a medical problem; a medical problem is defined as any physiological compromise that requires medical attention (a visit to a medical facility). Participation in extracurricular activities is not a valid basis for an excused absence; if there is any question, see me first.

Rules for the course

The rules for this course are outlined in the “Student Code of Conduct” for the University of Idaho. The most important of these rules are listed below:

ARTICLE II--ACADEMIC HONESTY.
1. Cheating on classroom or outside assignments, examinations, or tests is a violation of this code. Plagiarism, falsification of academic records, and the acquisition or use of test materials without faculty authorization are considered forms of academic dishonesty and, as such, are violations of this code. Because academic honesty and integrity are core values at a university, the faculty finds that even one incident of academic dishonesty seriously and critically endangers the essential operation of the university and may merit expulsion. [rev. 7-98]
2. The operation of UI requires the accuracy and protection of its records and documents. To use, make, forge, print, reproduce, copy, alter, remove, or destroy any record, document, or identification used or maintained by UI violates this code when done with intent to defraud or misinform. Entrance without proper authority into any private office or space of a member of the faculty, staff, or student body is a violation of this code.
3. Instructors and students are responsible for maintaining academic standards and integrity in their classes. Consequences for academic dishonesty may be imposed by the course instructor. Such consequences may include but cannot exceed a grade of “F” in the course. The instructor should attempt to notify the student of the suspected academic dishonesty and give the student an opportunity to respond. The notice and
the opportunity may be informal and need not be in writing. Penalties for any disciplinary
infraction must be judicially imposed. [See 1640.02 C-5] [rev. 7-98]

Learning Outcomes

In accordance with UI Learning Outcomes, it is expected that students will:

- Learn and Integrate: Students will apply their previous knowledge of biology to gain a basic understanding of the molecular basis of life.
- Think and Create: Students will be expected to apply the concepts and approaches learned here to solve future academic and professional problems.
- Communicate: Students will be expected to better communicate with others using the language of biology.
- Clarify Purpose and Perspective: It is expected that all students will gain important insights into molecular biology that allows them to exist, read and then contemplate this sentence.
- Practice Citizenship: It is every student’s responsibility to share their knowledge with others as the general public is ill-informed on many relevant topics like gene and stem cell therapies.

Disability Support Services
Reasonable accommodations are available for students who have documented temporary or permanent disabilities. All accommodations must be approved through Disability Support Services located in the Idaho Commons Building, Room 306 in order to notify your instructor(s) as soon as possible regarding accommodation(s) needed for the course.

- 885-6307
- email at <dss@uidaho.edu>
- website at <www.uidaho.edu/dss>

Students should present a completed and signed Accommodation Checklist for the current semester, from our office when requesting accommodations. If they do not, please refer them to the Disability Support Services office (Idaho Commons, Room 306) to obtain one. If you have any questions regarding a student(s) with a disability(s), or how to best work with a particular student in class, please contact our office.