

**Chem 450 CRN 77770**  
**Information Storage and Transfer - Molecules and Pathways**  
**Fall 2020**

**Instructor:** Dr. Maegan Weltzin, Murie 113E, 474-6527, mmweltzin@alaska.edu

**Office Hours:** Friday 11.15 - 1.15 via Slack. However, students are encouraged to contact the instructor by Slack or email at any time.

**Course materials**

The following materials are *required* for the course and can be purchased in the UAF bookstore or elsewhere:

**Textbook:** Principals of Biochemistry (2008) 7<sup>th</sup> Edition  
David L. Nelson and Michael M. Cox  
W. H. Freeman and Company, NY  
ISBN-10: 1-4641-2611-9

Most general biochemistry books provide adequate reading material with minimal difference in detail and depth on most topics.

**Homework system:** Sapling Learning

**Discussion Board:** Preusall (free!)

**Quick communication:** Slack account (free!) (click on the link in Blackboard to connect to our course channel)

**Course**

This 3-credit course will focus on the biochemistry (structure and dynamics) of cellular information storage and transfer linking the three principal macromolecules DNA, RNA, and Proteins including nucleotide metabolism, DNA structure and topology, DNA Replication/Repair/ Recombination, Cell Cycle Regulation, RNA transcription and processing, Gene Expression, Translation, and Protein Metabolism. Biomedical relevance and contemporary techniques will be addressed when appropriate.

**Paper Discussions**

Research paper(s) pertinent to topics addressed in readings, unit videos, and other exercises will be discussed with respect to rationale, hypothesis, research data, and analysis. Papers will be discussed using Preusall, a free discussion board. Papers will be available to start working on **one week prior** to the due date. You will be required to respond to at least five instructor questions, but responding to your peer's post will also be counted towards your grade. These discussions are important to translate science knowledge into understanding i.e. the application of science.

**Course Goals:**

- Develop an understanding of the biochemical processes underlying structure, function, regulation, and dynamics of DNA, RNA, and Proteins.
- Fundamentals include but are not limited to structure-function relations of protein/DNA interactions, regulation and synchronization of complex macromolecular processes, and protein quality control. All topics are discussed in the context of developmental processes and/or pathologies.

- Use of concepts to formulate hypotheses and interpret experimental data to benefit the understanding of current research through paper discussion.

### Learning Outcomes

1. Understand structure-function relationship determining macromolecular interactions
2. Aspects of synergism, cooperativity, and reciprocity relevant to macromolecular dynamics
3. Gene regulation – interplay among macromolecules and expression of phenotypes
4. Biomedical/disease-related aspects of topics
5. Critical reading of primary research literature
6. Understanding of principal methods and techniques

### Instructional Methods:

The teaching methods employed in this course will consist of short content videos, lecture notes, groupwork, and class discussions. Primary research papers allow to explore distinct topics more in depth through discussions and to translate science knowledge. Blackboard (<https://classes.uaf.edu>) will be utilized as the main platform to distribute assignments, lecture material, exams, and other announcements regarding the course. It is imperative that reading (see schedule) of sections should be done **in advance** to viewing the content videos, attempting exercises or other assignments. Taking notes while you read and watch the content videos will also help you stay engaged with the material. It is assumed that every student is frequently visiting blackboard to check for announcements as well as email for notifications.

### Grading

Exams: There will be four (4) **synchronous** exams (100 points each) over the course period (listed in course schedule; W 11:45 – 12:45). These exams will be a combination of multiple choice/short answer. It is expected that students can make our original in-person lecture time (W 11.45-12.45) and thus exams 1-3 will be given during this time slot. If you cannot make this time slot due to a scheduling conflict, please let your instructor know immediately so other arrangements can be made.

Papers: **Six paper** discussions over the term of the semester account for 100 points (20 points each paper, 5 out of 6 papers will be accounted for). Students are expected to contribute to these discussions with explanations and arguments. Five constructive responses to your instructor's questions, along with several responses to your peer's pose will be sufficient to receive full points.

Participation: **Class participation** will be included in the final grade (45 points). This entails active involvement in the group activities.

Homework: Sapling Learning will be used as the homework system. Each week, a problem set is assigned to help you interact with the material and to facilitate your learning (280pts)

Final project: There will be a group final project (75 points).

Homework (20 pts *14 HWs)	280 points
Paper Discussions (5 papers* 20 pts)	100 points
Class Participation	45 points
Final Project	75 points
Term Exam I	100 points
Term Exam II	100 points
Term Exam III	100 points
Term Exam IV	100 points
Total	900 Points

**Grade:**

**Percentage:**

A+	97-100
A	90-96
A-	88-89
B+	86-87
B	80-85
B-	78-79
C+	76-77
C	70-75
C-	68-69
D+	66-67
D	60-65
D-	58-59
F	0-57

### Course Policies

- Participation:* Regular participation is expected to ensure consistency in discussions and group activities.
- Exams:* Four exams will be given. Although exams are NOT cumulative, with the progression of the course a cumulative character is unavoidable. Makeup exams will only be allowed with pre-approval of the instructor, or with an acceptable, documented reason such as unexpected illness, family emergencies or other unavoidable events. The format of a make-up exam could vary from the original.
- Papers:* Students will have one week to read each paper, and respond to instructor questions and peer responses. **Emphasis** is put on an understanding of sections such as rationale, hypothesis, data/experimental design, results, and critical analysis.
- Homework:* Homework problems of key topics will help you check whether you understand the concepts fully, and also help to integrate the material into the greater context. For each homework assignment you are allowed 5 attempts per problem. Homework is due on Monday by 11pm (AK time).
- Final project:* There will be a group final project involving the course content. Students will receive adequate preparation time (>1 week).
- Work Ethic:* It is expected that all work turned in by each student is work completed by the student. Feel free to work together on homework, but a student's submitted work must be conducted and written by that student. Any copying or plagiarism will earn a zero for that assignment and will be reported to the University. For exams, all work must be that of the student and not homework help sites, peers, tutors, etc. Anyone caught using these resources during an exam will earn a zero for the assignment and will be reported to the University.
- Late Assignments:* Late assignments are not accepted unless with pre-approval from the instructor, or with an acceptable, documented reason such as unexpected illness, family emergencies or other unavoidable events.

### Ethical Considerations:

The Chemistry Department's policy of cheating is as follows: ***"Any student caught cheating will be assigned a course grade of F. The student's academic advisor will be notified of this failing grade and the student will not be allowed to drop the course"***.

Students must also adhere to UAF policies, the student code of conduct as well as the University of Alaska *Honor Code*, which states:

*Students will not collaborate on any quizzes, in-class exams, or take-home exams that will contribute to their grade in a course, unless permission is granted by the instructor of the course. Only those materials permitted by the instructor may be used to assist in quizzes and examinations. Students will not represent the work of others as their own. A student will attribute the source of information not original with himself or herself (direct quotes or paraphrases) in compositions, theses, and other reports. No work submitted for one course may be submitted for credit in another course without the explicit approval of both instructors. Violations of the Honor Code will result in a failing grade for the assignment and, ordinarily, for the course in which the violation occurred. Moreover, violation of the Honor Code may result in suspension or expulsion.*

**Plagiarism Policy:**

Plagiarism is defined as the use of “other” intellectual property without proper reference to the original author. Intellectual property includes all electronic, spoken or print media **thus any information taken of the web is included under this statement**. Students are expected to cite all sources used in oral and written presentations. Cases of plagiarism will be taken seriously with a grade 0 for the particular assignment. Severe cases may be referred to the Department Chair or Dean or class failing considered.

**Disabilities**

Students with a physical or learning disability are required to identify themselves to the Disability Services office, 474-7043, located in the Center for Health and Counseling. The student must provide documentation of the disability. Disability Services will then notify the instructor of special arrangements for taking tests, working homework assignments, and doing lab work.

**Computer Access:** Currently Department of Computing and Communications (DCC) maintains two open labs on campus: the Bunnell Lab, and the Node (Rasmussen library). The Node has 24-hour access.

**Support Services:** Support can be obtained through the University of Alaska Library system, online resources, and the instructor. Additional services are available through Student Support Services (<http://www.uaf.edu/sssp/>) at UAF.

**Classroom Etiquette:** The purpose of this information is to assist students in understanding proper classroom behavior. The classroom should be a learning centered environment in which faculty and students are unhindered by disruptive behavior. Students are expected to maintain proper decorum in the online classroom. The University of Alaska Fairbanks is an institution of higher education that promotes the free exchange of ideas. However, students must adhere to the rules set forth by the University and the instructor. Failure to comply with classroom rules may result in dismissal from the class and/or the University. Faculty have the authority to manage their classrooms to ensure an environment conducive to learning. The University of Alaska Student Code of Conduct (the Code), part of the Board of Regents Policy 09.02, is available at <https://www.alaska.edu/bor/policy/09-02.pdf>. You should be familiar with the Code as you will be held accountable to maintain the standards stated within. The Code includes the following statements:

P09.02.020.A As with all members of the university community, the university requires students to conduct themselves honestly and responsibly and to respect the rights of others. Students may not engage in behavior that disrupts the learning environment, violates the rights of others or otherwise violates the Student Code of Conduct (Code), university rules, regulations, or procedures. Students and student organizations will be responsible for ensuring that they and their guests comply with the Code while on property owned or controlled by the university or at activities authorized or sponsored by the university.

P09.02.030.B Behavior that occurs on property owned or controlled by the university, in university online environments and classes, or at activities sponsored by or authorized by the university, is subject to university student conduct review and disciplinary action by the university. The Student Code of Conduct may also apply to behavior that occurs off campus when it may present a potential danger or threat to the health and safety of others or may reasonably lead to a hostile environment on campus. The Student Code of Conduct may also apply to behavior exhibited online or electronically via email, social media, text messaging, or other electronic means.

### Amending Syllabus

The instructor may initiate changes to this syllabus subject to majority approval by students. Any and all changes will be clearly communicated (oral, email, blackboard). The instructor reserves the right to make minor change to the lecture schedule or calendar and any grading policies that are favor of the student.

**COVID-19 Awareness:** Students should keep up-to-date on the university's policies, practices, and mandates related to COVID-19 by regularly checking this website:

<https://sites.google.com/alaska.edu/coronavirus/uaf/uaf-students?authuser=0>

Further, students are expected to adhere to the university's policies, practices, and mandates and are subject to disciplinary actions if they do not comply.

### Special Dates pertinent to the course

See academic calendar for details at <http://catalog.uaf.edu/calendar/>.

## Course Schedule

### Overall course due dates:

- Homework released on Monday due the following Monday (every week)
- Perusall discussion on Friday (six times during the semester)
- Groupwork due Thursday (every so often)
- Exams 1-3 due on Wed (except Exam 4, due Monday)

Unit (Chapter) [Monday date]	Topic and Activities	Text	Assignment Due Dates
Unit 1 (Part of 8 & 22) [8-24]	<b>Welcome and Nucleotide Basics (Chemistry &amp; Biosynthesis)</b> <ul style="list-style-type: none"> <li>• <b>Reading:</b> <ul style="list-style-type: none"> <li>○ Welcome letter</li> <li>○ Parts of Ch. 8 &amp; 22</li> <li>○ Lecture Notes</li> </ul> </li> <li>• <b>Watch:</b> <ul style="list-style-type: none"> <li><i>In the "Getting Started" folder</i> <ul style="list-style-type: none"> <li>○ Welcome video</li> <li>○ Video: Intro to Sapling Learning</li> </ul> </li> <li><i>In the "Unit 1" course content folder</i></li> </ul> </li> </ul>	279-85, 310-13 888-899	<ul style="list-style-type: none"> <li>• HW #1 (due Monday, 8/31)</li> <li>• Use Slack and google docs with your group to generate nucleotide concept map (due Thursday, 9/3).</li> </ul>

	<ul style="list-style-type: none"> <li>○ Video 1.1: Nucleotide basics</li> <li>○ Video 1.2: Do novo purine nucleotide synthesis</li> <li>○ Video 1.3: De novo pyrimidine nucleotide synthesis and Salvage pathway</li> <li>○ Thymidylate Synthase Mechanism</li> <li>● <b>Simulations and Exercises:</b> <ul style="list-style-type: none"> <li>○ Sapling Nucleotide Structure simulation</li> <li>○ Groupwork: Nucleotide structure concept map (short video explanation)</li> </ul> </li> </ul>		
Unit 2 (Part of 8, 22 & 24) [8-31]	<b>Nucleotide Degradation &amp; Associated Diseases; DNA Structure; DNA lab techniques</b> <ul style="list-style-type: none"> <li>● <b>Reading:</b> <ul style="list-style-type: none"> <li>○ Parts of 8, 22, &amp; 24</li> <li>○ Lecture Notes</li> </ul> </li> <li>● <b>Watch:</b> <ul style="list-style-type: none"> <li>○ Video 2.1: Nucleotide degradation</li> <li>○ Video 2.2: Degradation diseases</li> <li>○ Video 2.3: DNA Structure</li> <li>○ Video 2.4 DNA structure movie</li> <li>○ Video 2.5: Forms of DNA Structure</li> </ul> </li> <li>● <b>Simulations and Exercises:</b> <ul style="list-style-type: none"> <li>○ Sapling metabolism map</li> <li>○ Groupwork: Metabolism pathway</li> <li>○ DNA/RNA structure simulation</li> <li>○ Lab techniques animations and simulations: Sanger Sequencing and PCR</li> </ul> </li> </ul>	899-903, 282-96	<ul style="list-style-type: none"> <li>● HW #2 (due Monday, 9/7)</li> <li>● Groupwork: Metabolism map (due Thursday, 9/10)</li> <li>● <b>Perusall Discussion:</b> Who are you? (Introduce yourself to the class using the General Discussion chat area (Friday, 9/11))</li> <li>● Slack message metabolism map in group chat (due Thursday, 9/10)</li> <li>● Find a time for us to meet using this google sheet link: <a href="https://docs.google.com/spreadsheets/d/1nG4nuMeNvfW4fbF94VFKKdBjSRq6yAJR7J22MO1Q_Kk/edit?usp=sharing">https://docs.google.com/spreadsheets/d/1nG4nuMeNvfW4fbF94VFKKdBjSRq6yAJR7J22MO1Q_Kk/edit?usp=sharing</a></li> </ul>
Unit 3 (Ch 24) [9-7]	<b>DNA Topology and Chromosome Structure</b> <ul style="list-style-type: none"> <li>● <b>Reading:</b> <ul style="list-style-type: none"> <li>○ Ch 24</li> <li>○ Lecture Notes</li> </ul> </li> <li>● <b>Watch:</b> <ul style="list-style-type: none"> <li>○ Video 3.1: DNA Topology</li> <li>○ Video 3.2: Topoisomerases</li> <li>○ Video 3.3: 3D packing of nuclear chromosomes</li> <li>○ Video 3.4: Chromatin, Histones, and Modifications</li> </ul> </li> </ul>	957-82	<ul style="list-style-type: none"> <li>● HW #3 (due Monday, 9/14)</li> <li>● <b>Paper Discussion #1:</b> Topoisomerase (due Friday, 9/18)</li> <li>● <b>Exam 1 due next week! (Wed, 9/16) Start studying early.</b></li> <li>● First Student-Instructor Meeting</li> </ul>

	<ul style="list-style-type: none"> <li>○ Video 3.5: DNA Gel electrophoresis video</li> <li>○ <i>Optional</i>: 2 DNA topology videos</li> <li>• <b>Paper Discussion #1 (Topoisomerase)</b></li> <li>• <b>Simulations and Exercises</b> <ul style="list-style-type: none"> <li>○ none</li> </ul> </li> </ul>		
Unit 4 (Ch 25, part 26) [9-14]	<b>Exam 1 &amp; DNA Replication</b> <ul style="list-style-type: none"> <li>• <b>Reading:</b> <ul style="list-style-type: none"> <li>○ Ch 25 &amp; part of Ch 26</li> <li>○ Lecture Notes</li> </ul> </li> <li>• <b>Watch:</b> <ul style="list-style-type: none"> <li>○ Video 4.1: DNA Replication</li> <li>○ Video 4.2: Nucleotide Polymerization by DNA Polymerase</li> <li>○ Video 4.3: Telomere Replication</li> <li>○ <i>Optional but very interesting and applicable</i>: Video 4.4: The science of cells that never get old by Noble Prize winner Dr. Blackburn</li> </ul> </li> <li>• <b>Simulations and Exercises:</b> <ul style="list-style-type: none"> <li>○ DNA Replication Simulation</li> <li>○ DNA Polymerase Simulation</li> </ul> </li> </ul> <b>Exam 1 THIS week (will cover Units 1-3)!</b>	987 – 1005 & 1067 – 1070	<ul style="list-style-type: none"> <li>• <b>Exam 1 due Wed, 9/16)!</b></li> <li>• HW #4 (due Monday, 9/21)</li> </ul>
Unit 5 (Ch 25) [9-21]	<b>DNA Repair and Recombination</b> <ul style="list-style-type: none"> <li>• <b>Reading:</b> <ul style="list-style-type: none"> <li>○ Ch 25 &amp; part of Ch 26</li> <li>○ Lecture Notes</li> </ul> </li> <li>• <b>Watch:</b> <ul style="list-style-type: none"> <li>○ Video 5.1: Need for DNA Repair</li> <li>○ Video 5.2: Mismatch Repair</li> <li>○ Video 5.3: Base-Excision Repair</li> <li>○ Video 5.4: Nucleotide-Excision Repair</li> <li>○ Video 5.5: Nucleotide Excision Repair Diseases</li> <li>○ Video 5.6: Error-prone translesion synthesis</li> <li>○ Video 5.7: Homology-dependent double strand break repair</li> <li>○ Video 5.8: Non-homologous end joining repair</li> <li>○ Video 5.9: Lab and future application: CRISPR/Cas systems</li> <li>○ <i>Optional</i>: CRISPR: Gene editing and beyond</li> </ul> </li> <li>• <b>Simulations and Exercises:</b></li> </ul>	1005 – 1031 & 342-343	<ul style="list-style-type: none"> <li>• HW #5 (due Monday, 9/28)</li> </ul>

	<ul style="list-style-type: none"> <li>○ DNA Mutation and Repair</li> </ul>		
Unit 6 (Ch 12) [9-28]	<b>Cell Cycle Regulation and Oncogene/Tumor Suppressor/Cancer</b> <ul style="list-style-type: none"> <li>• <b>Reading:</b> <ul style="list-style-type: none"> <li>○ Ch 12</li> <li>○ Lecture Notes</li> </ul> </li> <li>• <b>Watch:</b> <ul style="list-style-type: none"> <li>○ Video 6.1: Cyclins and CDKs Cell Cycle Regulation</li> <li>○ Video 6.2: Activation of CDKs</li> <li>○ Video 6.3: Apoptosis (<a href="https://www.youtube.com/watch?v=-vmtK-bAC5E">https://www.youtube.com/watch?v=-vmtK-bAC5E</a>)</li> </ul> </li> <li>• <b>Paper Discussion #2 (DNA Repair)</b></li> <li>• <b>Simulations and Exercises</b> <ul style="list-style-type: none"> <li>○ none</li> </ul> </li> </ul>	476 - 487	<ul style="list-style-type: none"> <li>• HW #6 (due Monday, 10/5)</li> <li>• <b>Paper Discussion #2:</b> DNA Repair (due Friday, 10/9)</li> <li>• <b>Exam 2 due next week! (Wed, 10/7)</b> <b>Start studying early.</b></li> </ul>
Unit 7 (Ch 26) [10-5]	<b>Exam II + RNA Polymerase + Transcription</b> <ul style="list-style-type: none"> <li>• <b>Reading:</b> <ul style="list-style-type: none"> <li>○ Ch 26</li> <li>○ Lecture Notes</li> </ul> </li> <li>• <b>Watch:</b> <ul style="list-style-type: none"> <li>○ Video 7.1: mRNA and tRNA function</li> <li>○ Video 7.2: Ribosome structure</li> <li>○ Video 7.3: Transcription in prokaryotes</li> <li>○ Video 7.4: Eukaryotic RNA Transcription (focus on initiation)</li> <li>○ Video 7.5: Eukaryotic RNA transcription (all steps)</li> </ul> </li> <li>• <b>Simulations and Exercises:</b> <ul style="list-style-type: none"> <li>○ Sapling: Transcription</li> <li>○ Groupwork: Compare and contrast prokaryotic and eukaryotic transcription</li> </ul> </li> </ul> <b>Exam II THIS week (will cover Units 4-6)!</b>	1035 - 47	<ul style="list-style-type: none"> <li>• <b>Exam 2 due Wed, 10/7</b></li> <li>• HW #7 (due Monday, 10/12)</li> <li>• Groupwork: Transcription (due Thursday, 10/15)</li> </ul>
Unit 8 (Ch 26) [10-12]	<b>RNA processing (capping, poly A, splicing, editing)</b> <ul style="list-style-type: none"> <li>• <b>Reading:</b> <ul style="list-style-type: none"> <li>○ Ch 26</li> <li>○ Lecture Notes</li> </ul> </li> <li>• <b>Watch:</b> <ul style="list-style-type: none"> <li>○ Video 8.1: Structure of genes</li> </ul> </li> </ul>	1047 - 63	<ul style="list-style-type: none"> <li>• HW #8 (due Monday, 10/19)</li> <li>• <b>Paper Discussion #3:</b> RNAP mechanism (due Friday, 10/23)</li> </ul>

	<ul style="list-style-type: none"> <li>○ Video 8.2: mRNA 5'cap and poly-A tail (<a href="https://www.youtube.com/watch?v=DoSRu15VtdM">https://www.youtube.com/watch?v=DoSRu15VtdM</a>)</li> <li>○ Video 8.3: mRNA Splicing (<a href="https://www.youtube.com/watch?v=YgmoHtLGb5c">https://www.youtube.com/watch?v=YgmoHtLGb5c</a>)</li> <li>○ Video 8.4: mRNA splicing</li> <li>○ Video 8.5: Life cycle of mRNA</li> <li>• <b>Simulations and Exercises:</b> <ul style="list-style-type: none"> <li>○ none</li> </ul> </li> </ul>		
Unit 9 (Ch 28) [10-19]	<b>Gene Expression</b> <ul style="list-style-type: none"> <li>• <b>Reading:</b> <ul style="list-style-type: none"> <li>○ Ch 28</li> <li>○ Lecture Notes</li> </ul> </li> <li>• <b>Watch:</b> <ul style="list-style-type: none"> <li>○ TBD</li> </ul> </li> <li>• <b>Simulations and Exercises:</b> <ul style="list-style-type: none"> <li>○ TBD</li> </ul> </li> </ul>	1127 - 69	<ul style="list-style-type: none"> <li>• HW #9 (due Monday, 10/26)</li> <li>• <b>Paper Discussion #4:</b> siRNA or editing (due Friday, 10/30)</li> <li>• <b>Exam 3 due next week! (Wed, 10/28)</b> <b>Start studying early.</b></li> <li>• Second student-instructor meeting</li> </ul>
Unit 10 (Ch 28 & parts of Ch 26) [10-26]	<b>Exam III, Chromatin Dynamics, Translation (Genetic Code, tRNA)</b> <ul style="list-style-type: none"> <li>• <b>Reading:</b> <ul style="list-style-type: none"> <li>○ Ch 28 &amp; parts of Ch 26</li> <li>○ Lecture Notes</li> </ul> </li> <li>• <b>Watch:</b> <ul style="list-style-type: none"> <li>○ TBD</li> </ul> </li> <li>• <b>Simulations and Exercises:</b> <ul style="list-style-type: none"> <li>○ TBD</li> </ul> </li> </ul> <p><b>Exam 3 due THIS week! (Wed, 10/28) will cover units 7-8)</b></p>	1147-69, 1055-58, 1077-88	<ul style="list-style-type: none"> <li>• HW # 10 (due Monday, 11/2)</li> <li>• <b>Paper Discussion #5:</b> chromatin (due Friday, 11/6)</li> <li>• <b>Exam 3 due Wed, 10/28 (will cover units 7-8)</b></li> </ul>
Unit 11 (Ch 27) [11-2]	<b>Translation: Ribosomes, Initiation, Elongation</b> <ul style="list-style-type: none"> <li>• <b>Reading:</b> <ul style="list-style-type: none"> <li>○ Ch 27</li> <li>○ Lecture Notes</li> </ul> </li> <li>• <b>Watch:</b> <ul style="list-style-type: none"> <li>○ TBD</li> </ul> </li> <li>• <b>Simulations and Exercises:</b> <ul style="list-style-type: none"> <li>○ TBD</li> </ul> </li> </ul>	1088-114	<ul style="list-style-type: none"> <li>• HW # 11 (due Monday, 11/9)</li> <li>• Groupwork: TBD</li> </ul>

Unit 12 (Ch 4 & Ch 27) [11-9]	<b>Translation: Termination Degradation, Protein Folding, Protein Sorting</b> <ul style="list-style-type: none"> <li>• <b>Reading:</b> <ul style="list-style-type: none"> <li>○ Ch 4 &amp; Ch 27</li> <li>○ Assigned literature</li> <li>○ Lecture Notes</li> </ul> </li> <li>• <b>Watch:</b> <ul style="list-style-type: none"> <li>○ TBD</li> </ul> </li> <li>• <b>Simulations and Exercises:</b> <ul style="list-style-type: none"> <li>○ TBD</li> </ul> </li> </ul>	Literature, 115-51, 1100-09	<ul style="list-style-type: none"> <li>• HW # 12 (due Monday, 11/16)</li> <li>• Groupwork: TBD</li> </ul>
Unit 13 (Ch 27) [11-16]	<b>Protein Targeting and Protein Degradation</b> <ul style="list-style-type: none"> <li>• <b>Reading:</b> <ul style="list-style-type: none"> <li>○ Ch 27</li> <li>○ Assigned literature</li> <li>○ Lecture Notes</li> </ul> </li> <li>• <b>Watch:</b> <ul style="list-style-type: none"> <li>○ TBD</li> </ul> </li> <li>• <b>Simulations and Exercises:</b> <ul style="list-style-type: none"> <li>○ TBD</li> </ul> </li> </ul>	1114-23	<ul style="list-style-type: none"> <li>• HW # 13 (due Monday, 11/23)</li> <li>• <b>Paper Discussion #6:</b> Protein folding/degradation (due <b>Tuesday</b>, 11/24)</li> </ul>
Unit 14 [11-23]	<b>Unfolded Protein Response + Work on Final Project</b> <ul style="list-style-type: none"> <li>• <b>Reading:</b> <ul style="list-style-type: none"> <li>○ Assigned literature</li> <li>○ Lecture Notes</li> </ul> </li> <li>• <b>Watch:</b> <ul style="list-style-type: none"> <li>○ TBD</li> </ul> </li> <li>• <b>Simulations and Exercises:</b> <ul style="list-style-type: none"> <li>○ none</li> </ul> </li> </ul> <p>(Thanksgiving break (no classes, most offices closed) Wednesday-Sunday, Nov. 25-29)</p>	literature	<ul style="list-style-type: none"> <li>• Work on Final Project (due during Unit 15!)</li> <li>• <b>Third student-instructor meeting</b></li> </ul>
Unit 15 (Ch 6) [11-30]	<b>Enzyme Kinetics + Final Project due</b> <ul style="list-style-type: none"> <li>• <b>Reading:</b> <ul style="list-style-type: none"> <li>○ Ch 6</li> <li>○ Lecture Notes</li> </ul> </li> <li>• <b>Watch:</b> <ul style="list-style-type: none"> <li>○ TBD</li> </ul> </li> <li>• <b>Simulations and Exercises:</b> <ul style="list-style-type: none"> <li>○ TBD</li> </ul> </li> </ul>	187-236	<ul style="list-style-type: none"> <li>• HW # 14 (due Monday, 12/7)</li> <li>• Exam 4 due next week! (<b>Monday, 12/7</b>). Start studying early!</li> </ul>
Unit 16 [12-7]	<b>Final Exam 11:15 a.m. - 2:15 p.m., Monday, December 7</b>		