

**Biochemistry 501:  
Introduction to Biochemistry  
Spring 2015**

MWF, 12:05 pm – 12:55 pm, Room 125 Agricultural Hall, 1450 Linden Dr.

**Teaching Team and Office Hours:**

Professors:

Dr. Samuel Butcher, MWF, 1:10 pm – 2:10 pm; 141E DeLuca Biochemistry Laboratories, 433 Babcock Dr., [sebutcher@wisc.edu](mailto:sebutcher@wisc.edu)

Dr. Richard Amasino, MWF, 1:10 pm – 2:10 pm; 215B DeLuca Biochemistry Laboratories, 433 Babcock Dr., [amasino@wisc.edu](mailto:amasino@wisc.edu)

Course Coordinator and Lecturer:

Dr. Lisa Lenertz, MWF, 10:00 am – 11:30 am, T 9:50 am – 10:50 am; 1142E DeLuca Biochemistry Building, 420 Henry Mall, [lenertzlinde@wisc.edu](mailto:lenertzlinde@wisc.edu)

Teaching Assistants:

Jessica Cardenas, [jjcardenas@wisc.edu](mailto:jjcardenas@wisc.edu)

Elisa Frankel, [efrankel@wisc.edu](mailto:efrankel@wisc.edu)

Kalie Mix, [kmix@wisc.edu](mailto:kmix@wisc.edu)

**COURSE INFORMATION:**

**Course Description:** Biochemistry 501 is a three-credit course in which we will examine the chemical and physical processes that occur within living organisms.

**Course Accessibility:** The teaching team strives to provide everyone the opportunity to learn biochemistry. Please let the course coordinator know if you have additional learning considerations relating to the curriculum, instruction, or assessment of this course that will enable you to engage in the course more fully. We will keep any information you share with us confidential.

**Learn@UW:** The following course materials can be accessed at our Learn@UW course website: course syllabus, course packets, textbook references, all lecture slides, problem sets and answers, recorded lectures, practice exams and answers, and all course announcements regarding exam review sessions, exam locations, and grades. Visit Learn@UW frequently for announcements.

**Course Packets:** For each of the four parts of the course, you may access and print the course packet from Learn@UW **OR** purchase a course packet at the DoIT Tech Store (located in the Computer Sciences and Statistics Bldg, 1210 West Dayton St). The course packets contain all materials that relate to a given part of the course, including lecture slides, problem sets and solutions, practice exams and answers. The course packets are usually available a few days prior to the start of each section of the course and currently cost ~ \$8. When the course packets are available, an announcement will be made in class and posted on Learn@UW.

**Lecture Recordings:** We will video record each lecture. The videos should be posted within 24 hours after class. **Media files can be accessed directly from Learn@UW.**

**Discussion Sections:** A team of former 501 undergraduates, graduate students, a postdoc and the course coordinator will lead optional discussion sections. Although attendance is optional, we strongly encourage you to attend one or more sections each week. The discussion sections will provide an opportunity to study for the course in a small group. We encourage you to bring questions about lecture topics, the problem sets and the practice exams to the discussion sections. In addition, extra study guide materials, such as additional problems designed to reinforce the important points from the lectures, will be provided. *You do not need to sign up for the discussion sections.* Days, times, and locations of the discussion sections are found on Learn@UW.

**Textbook - Recommended (Not Required):** *Lehninger Principles of Biochemistry*, by Nelson and Cox, 6<sup>th</sup> edition. We will not assign readings or homework directly from the textbook; however, the lectures will closely follow this textbook and we encourage you to use the book as a study guide and reference. The parts of the book relevant to lecture will be referenced by providing page numbers or by providing the number of the figures in the book that correspond to the images used in lecture. (The figures are labeled sequentially in each chapter; thus, Figure 22-5 is the 5<sup>th</sup> figure in Chapter 22.) Here are your options for the textbook.

1. Use reserve copies. We keep a few copies of the textbook on reserve at Steenbock and Helen C White libraries.
2. Buy a used book. There should be some 6<sup>th</sup> edition used books available. Furthermore, an old copy of the 4<sup>th</sup> or 5<sup>th</sup> edition will be suitable for almost all of the material we cover in the course.
3. The publisher is offering a loose-leaf, full color copy of the book, along with electronic resources, for \$123.75. The electronic resources include one-year access to a resource

called LaunchPad and the electronic copy of the book. LaunchPad has a variety of problems and other resources that may be of use in learning the material. The supplemental problems are found by clicking on the LearningCurve Activity link. You will need to buy a 3-ring binder for the loose-leaf book. The loose-leaf book and the access card to the electronic resources are available for purchase in the bookstore.

4. Buy a new hardcover textbook (in the range of \$250).

**Exams:** There will be three evening exams given after the completion of parts I, II, and III (exam date/time in syllabus). The final exam is comprehensive, covering part IV (2/3 of the final exam) and parts I-III (1/3 of the final exam). Exams are multiple choice and true/false questions; a sample exam for each section is provided at Learn@UW and in the course packet.

**You must bring a photo ID to the exam and take the exam in the room assigned to you by the course coordinator.** Failure to take the exam in the correct room will result in a loss of a full letter grade from your exam score.

**Exams are collected at the end of the exam period.** Approximately 1 – 3 days after each exam, you will be able to view your grade on Learn@UW. You will be able to view the questions you answered incorrectly by seeing the course coordinator or one of the TAs.

**Exam conflicts:** We will try to accommodate students who have a legitimate conflict with a biochemistry exam. Our policy is to offer an exam *earlier that same day*. We do not offer late alternate exam times. If you have an exam conflict, fill out an Alternate Exam Request Form in the course coordinator's office and note which exam you have a conflict with. If your request is approved you will receive an email with the time and location a few days before the exam. ***No alternate exams will be offered for the final.***

### Grading:

Three Exams (100 pts each)	300 pts
Final Exam	150 pts
<b>Total Possible Exam Points:</b>	<b>450 pts</b>

Below is the most stringent grade scale that will be applied to the course. We guarantee that if you score within these ranges, you will receive the grade indicated.

	<u>Percent of 450 exam points</u>	<u>Total points</u>
A =	90 – 100%	405 or greater
AB =	86 – 89.9%	387 – 404
B =	80 – 85.9%	360 – 386
BC =	76 – 79.9%	342 – 359
C =	55% – 75.9%	248 – 341
D =	40% – 54.9%	180 – 247
F =	0% – 39.9%	0 – 179

**iClicker:** We will be asking multiple choice questions throughout the lectures to help reinforce important concepts. Please bring an iClicker if you would like to participate. You do not need to register your iClicker.

**Academic misconduct:** Academic dishonesty or cheating of any type will not be tolerated. Any student participating in **any form** of dishonesty will receive a zero for the exam in question. If a person is caught a second time, a semester grade of "F" will be given for the course. Every instance of academic dishonesty is reported to the Academic Standards Committee, which may impose further penalties. For the full policy on academic dishonesty, see <http://students.wisc.edu/saja/index.html>.

**Cell phones:** Cell phones should be turned off or silenced when in the classroom. If you are on call for work or have a personal emergency that requires you to have your cell phone on, please lower the volume on your device and sit near an exit.

**How to succeed in this class:** To succeed it is important to study consistently and effectively. Here are some suggestions for effective studying.

- ▶ Before class, **read the suggested chapter** and lecture notes. Focus on general concepts rather than getting lost in the details. This “priming” exercise will make lecture easier to follow.
- ▶ **Attend class** faithfully. As soon as possible after lecture, go over your notes and fill in parts that you do not fully understand using material from the textbook that applies to the topic covered in lecture. If you did not understand something, also review the lecture video and study the Clicker questions that are designed to help you learn important concepts.
- ▶ **Writing is important to learning.** Highlighting sentences with marker pen is not an effective way to transfer knowledge to the brain. Rather, putting concepts into your own words and writing them down results in your assimilating the concepts and recognizing relationships among concepts.
- ▶ Making **flash cards** is one version of using writing to learn concepts and recognize relationships. Picking out the most important concepts and putting them in your own words and writing them down is a powerful learning tool. Try pulling random cards from the stack and ask yourself “how do these ideas relate to each other?”
- ▶ **Study groups** are recommended. Although certain concepts in biochemistry can be memorized, the majority must be learned, and discussing biochemistry with others is a good way to learn. Join a discussion group.
- ▶ **Complete the problem sets** provided in the course packet. Research has shown that working through problems is one of the best ways to prepare for a multiple-choice exam.
- ▶ Taking accurate and complete notes and asking questions are part of the learning process. If you do not understand a topic that was presented in class, **ask questions**.

## Lecture Schedule

<b>Part 1: Structural and Catalytic Components of Cells – Prof. Butcher</b>			
<b>Lecture</b>	<b>Topic</b>	<b>Day of the Week</b>	<b>Date</b>
1	Overview of the course, chemical principles, and cellular basics	Wednesday	January 21
2	Structure and Properties of Water, pH, Buffers	Friday	January 23
3	Amino Acids and Primary Protein Structure	Monday	January 26
4	Protein Purification and Analysis	Wednesday	January 28
5	Protein Structure	Friday	January 30
6	Protein Function	Monday	February 2
7	Enzymes	Wednesday	February 4
8	Enzyme Structure, Function, and Regulation	Friday	February 6
9	Enzyme Inhibition, Lipids	Monday	February 9
10	Lipids as Signaling Molecules, Membrane Structure	Wednesday	February 11
11	Membrane Proteins, Transporters	Friday	February 13
<b><i>Review Session</i></b>	<b><i>Time and Location TBA *OPTIONAL*</i></b>	<b><i>Sunday</i></b>	<b><i>February 15</i></b>
<b><i>Exam 1</i></b>	<b><i>7:15 pm, Location TBA</i></b>	<b><i>Tuesday</i></b>	<b><i>February 17</i></b>

<b>Part 2: Energy Production: Catabolism and Bioenergetics – Prof. Amasino</b>			
<b>Lecture</b>	<b>Topic</b>	<b>Day of the Week</b>	<b>Date</b>
1	Thermodynamics and Bioenergetics	Monday	February 16
2	Glycolysis	Wednesday	February 18
3	After Glycolysis: Fermentation or Citric Acid Cycle	Friday	February 20
4	Citric Acid Cycle	Monday	February 23
5	Catabolism of Lipids	Wednesday	February 25
6	Nitrogen Utilization	Friday	February 27
7	Mitochondrial Electron Transport	Monday	March 2
8	ATP Synthesis	Wednesday	March 4
9	Photosynthesis	Friday	March 6
10	Metabolism and Evolution	Monday	March 9
<b><i>Review Session</i></b>	<b><i>Time and Location TBA *OPTIONAL*</i></b>	<b><i>Sunday</i></b>	<b><i>March 8</i></b>
<b><i>Exam 2</i></b>	<b><i>7:15 pm, Location TBA</i></b>	<b><i>Tuesday</i></b>	<b><i>March 10</i></b>

**Part 3: Biosynthesis and Metabolic Regulation – Dr. Lenertz**

<b>Lecture</b>	<b>Topic</b>	<b>Day of the Week</b>	<b>Date</b>
1	Cell Signaling and Metabolism	Wednesday	March 11
2	Pentose Phosphate Pathway	Friday	March 13
3	Regulation of Blood Glucose I: Gluconeogenesis	Monday	March 16
4	Regulation of Blood Glucose II: Glycogen Metabolism	Wednesday	March 18
5	Regulation of Blood Glucose III: Hormonal Control	Friday	March 20
6	Biosynthesis of Fatty Acids and Phospholipids	Monday	March 23
7	Biosynthesis of Ketones, Sterols, and Isoprenoids	Wednesday	March 25
8	Cholesterol Regulation and Lipoproteins	Friday	March 27
9	Biosynthesis of Amino Acids and Porphyrins	Monday	April 6
10	Biosynthesis of Nucleotides	Wednesday	April 8
11	Catch Up & Review	Friday	April 10
<b><i>Review Session</i></b>	<b><i>Time and Location TBA *OPTIONAL*</i></b>	<b><i>Sunday</i></b>	<b><i>April 12</i></b>
<b><i>Exam 3</i></b>	<b><i>7:15 pm, Location TBA</i></b>	<b><i>Tuesday</i></b>	<b><i>April 14</i></b>

**Part 4: Genetic Information Transfer – Dr. Lenertz**

<b>Lecture</b>	<b>Topic</b>	<b>Day of the Week</b>	<b>Date</b>
1	Introduction to Information Transfer	Monday	April 13
2	DNA and Chromosome Structure	Wednesday	April 15
3	DNA Replication	Friday	April 17
4	Mutagenesis and Repair	Monday	April 20
5	Large Scale Genome Dynamics	Wednesday	April 22
6	Transcription	Friday	April 24
7	Gene Regulation	Monday	April 27
8	RNA processing	Wednesday	April 29
9	Translation	Friday	May 1
10	Epigenetics	Monday	May 4
11	Molecular Techniques	Wednesday	May 6
12	Catch Up & Review	Friday	May 8
<b><i>Final Exam (covering Parts I- IV)</i></b>	<b><i>Location TBA</i></b>	<b><i>Friday 10:05 am – 12:05 pm</i></b>	<b><i>May 15</i></b>