

**Biochemistry, Cell & Molecular Biology II (BIO366)**  
**Course Description, Learning Objectives, and Grading Policy**

*Note: This is the second in a series of three integrated courses  
in biochemistry, cell and molecular biology*

**Professors:**

**Dr. Anca Segall**

Office: LSN-331

Office Hours: By Appointment Only

E-mail: [asegall@sunstroke.sdsu.edu](mailto:asegall@sunstroke.sdsu.edu)

**Dr. Terry Frey**

Office: LSN-332A (am) / LSN104 (pm)

Office Hours: By appt. see Patti Swinford in LS 104 / [swinford@sciences.sdsu.edu](mailto:swinford@sciences.sdsu.edu)

E-mail: [tfrey@sunstroke.sdsu.edu](mailto:tfrey@sunstroke.sdsu.edu)

**Time & Locations:** Tuesday and Thursday, 11:00 - 12:15 in HH221; Friday, 12:00-12:50 in NE 60.

**Text:** Molecular Cell Biology, 5th Edition by Lodish, Baltimore, Berk, Zipursky, Matsudaira and Darnell. W. H. Freeman and Company, New York, 2004.

**Blackboard:** Class Notes, Practice Exams, Grades, etc. will be posted on SDSU's [Blackboard](#) site. You are expected to consult the class Blackboard site regularly for information and announcements about the course. We may also send announcements and information by E-mail via Blackboard, and we remind you that you are required by university policy to maintain an E-mail account registered with the university in order to receive such messages.

**Prerequisite:** Chemistry 365

**Course Description:** The material presented in this course builds on that presented in BCMB I (Chemistry 365). Although Biochemistry, Cell Biology, and Molecular Biology are still offered as separate courses at many institutions, these disciplines now largely overlap and most topics require an integrated approach for adequate understanding. The topics in this course include gene organization and expression, contemporary experimental approaches used in the study of genes and their proteins, regulation of gene expression, cellular membranes and transport, and cancer. The course is divided into four sections, and the lecture topics are listed in the course syllabus. Lectures will largely be based on the text; however, students are not responsible for all material presented in the text. Students are responsible for all material presented during lecture and any text material instructors asks them to know.

**Learning Objectives:** Upon successful completion of this course, participants will be able to:

1. Describe the general principles of gene organization and expression in both prokaryotic and eukaryotic organisms.
2. Interpret the outcome of experiments that involve the use of recombinant DNA technology and other common gene analysis techniques.
3. Discuss the various macromolecular components of cells and their functions.
4. Describe the structure and function of biological membranes including the roles of gradients in energy transduction.

5. Explain the basic pathways and mechanisms in biological energy transduction from oxidation of metabolites to synthesis of ATP.
6. Explain various levels of gene regulation and protein function including signal transduction and cell cycle control.
7. Relate properties of cancerous cells to mutational changes in gene function.

**Exams and Grading:** Four Exams will be given at the times and dates shown in the syllabus. These will be a mixture of multiple choice and short answer questions. Sample exam questions will be posted on [Blackboard](#). Each exam will cover the preceding section of the course **only** and **each will count for 25%** of your final grade. **No allowance will be made for missing any of the four exams except under compelling and documented reasons** (*e.g.* illness, death in your immediate family, *etc.*). If you miss an exam for **any reason you must contact the lecturer administering the exam as soon as possible** to make alternate arrangements.

**DOs:** **DO** ask us questions about material you don keep up with your reading and your studying easy to fall behind. **DO** ask questions about the course material in class embarrassed: if you have a question, many other people in the class will likely have the same question.

**DON** **DON** **Ts:** **T** let your cell phones ring during class times; if you expect a call, place your phone on vibrate. **DON** from an instructor will clear up a serious misunderstanding. **DON** can help it. There will be material presented in lectures that may not be in the book, or may be presented in different and easier ways. **Also, there may be class-time opportunities for extra credit.**

In order to pass this course you must receive an average of at least **50%** on the four exams.

### We will use the following Grade Scale:

A: 80.0-100

A-: 77-79.9

B+: 74-76.9

B: 71-73.9

B-: 68-70.9

C+: 65-67.9

C: 62-64.9

C-: 59-61.9

D+: 56-58.9

D: 53-55.9

D-: 50-52.9

F: <50

## Syllabus for Biochemistry, Cell & Molecular Biology II (BIO366)

<b>Biology</b>	<b>366</b>	<b>Biochemistry, Cell, and Molecular Biology II</b>		<b>Fall 2007</b>
		<b>Tues. / Thurs. 11:00 -12:15 12:00-12:50 -- NE 60</b>		
<b>Date</b>	<b>Day</b>	<b>Topic</b>	<b>Chapter*</b>	<b>Instructor</b>
8/28	T	Basic Molecular Genetics (Review)	Ch 4: 101-143	Segall
8/30	Th	Analysis of Mutations by Classical Genetic Methods	Ch 9: 351-360	Segall
8/31	F	DNA Cloning and Analysis of Cloned DNA Fragments	Ch 9: 361-374	Segall
9/4	T	Analysis of Cloned DNA Fragments (cont'd) Genomics	Ch 9: 375-387	Segall
9/6	Th	Altering Gene Expression by Recombinant DNA Methods	Ch 9: 387-400	Segall
9/7	F	Chromosomal Organization of Genes	Ch 10: 405-414	Segall
9/11	T	Mobile DNA	Ch 10: 414-424	Frey
9/13	Th	Chromosome Structure	Ch 10: 424-433	Frey
9/14	F	Replication Elements of Chromosomes Organelle DNA	Ch 10: 433-443	Frey
<b>9/18</b>	<b>T</b>	<b>EXAM I</b>		<b>Segall/Frey</b>
9/20	Th	Transcription Basics (Prokaryotes) Lac operon	Ch 4: 108-116	Segall
9/21	F	Eukaryotic RNA Polymerases	Ch 11: 447-454	Segall
9/25	T	Eukaryotic Transcription: Pol II Promoters and Transcription Factors	Ch 11: 455-460	Segall
9/27	Th	Eukaryotic Transcription: Activators and Repressors	Ch 11: 461-468	Segall
9/28	F	Pol II Transcription Initiation Chromatin Modifications and Gene Expression	Ch 11: 469-480	Segall
10/2	T	Regulation of Transcription Factors Pol I and Pol III Promoters	Ch 11: 481-487	Segall
10/4	Th	RNA Processing: Splicing	Ch 12: 493-499	Segall
10/5	F	RNA Processing: Splicing (cont'd)	Ch 12: 499-504	Segall
10/9	T	Alternative mRNA Splicing Nucleocytoplasmic Transport	Ch 12: 505-516	Segall
10/11	Th	Post-Transcriptional Control rRNA and tRNA Processing	Ch 12:518-529	Segall
10/12	F	Review of Transcription	Ch 11, Ch 12	Segall

<b>10/16</b>	<b>T</b>	<b>EXAM II</b>		<b>Segall</b>
10/18	Th	Membranes and Membrane Transport: Chapters 5&7	Ch5: 147-62 Ch7: 245-260	Frey
10/19	F	Membrane Transport (cont.): Chapter 7	Ch7:260-275	Frey
10/23	T	Memb Transport (cont) Cellular Energetics - Glycolysis: Chapter 8	Ch8: 301-309	Frey
10/25	Th	Cellular Energetics - Citric Acid Cycle & Ox. Phos.	Ch8: 309-311; 313-322	Frey
10/26	F	Cellular Energetics - ATP Synthetase / Photosynthesis	Ch8: 325-345	Frey
10/30	T	Chapter 13: Cell Signaling	Ch8: 325-345 Ch13: 533-554	Frey
11/1	Th	Chapter 14: Signaling Pathways	Ch13: 555-564	Frey
11/2	F	Chapter 16: Protein Targeting and Transport	Ch14: 587-595	Frey
11/6	T	Chapter 16: Protein Targeting and Transport	Ch16: 657-677	Frey
11/8	Th	Chapter 17: Secretion and Endocytosis	Ch16: 683-694	Frey
11/9	F	Chapter 19: Cytoskeleton-Actin/Myosin	Ch19: 779-803	Frey
<b>11/13</b>	<b>T</b>	<b>EXAM III</b>		<b>Frey</b>
11/15	Th	Chapter 19: Cytoskeleton-Actin/Myosin &Intermediate Filaments	Ch19: 805-811	Frey
11/16	F	Chapter 20: Cytoskeleton-Microtubules	Ch20: 817-826; 831-843	Frey
11/20	T	Overflow ?		Frey
11/22		<b>Thanksgiving Break</b>		
11/27	T	Eukaryotic Cell Cycle: Overview	Ch21: 853-867	Segall
11/29	Th	Eukaryotic Cell Cycle: Genetics and Regulation	Ch21: 868-881	Segall
11/30	F	Eukaryotic Cell Cycle: Genetics and Regulation	Ch21: 881-893	Segall
12/4	T	Cancer: Tumor Cells and Genetic Basis	Ch23: 935-948	Frey
12/6	Th	Cancer: Types of Mutations	Ch23: 948-961	Frey
12/7	F	Carcinogens and DNA Repair	Ch23: 961-970	Frey
<b>12/ ?</b>	<b>?</b>	<b>EXAM IV 10:30-11:45</b>		<b>Frey/Segall</b>
<b>Text:</b>		*Lodish et al., Molecular Cell Biology 5th Ed., W.H. Freeman & Co	<b>2004</b>	
<b>Instructor</b>	<b>Contact Information</b>		<b>Office Hours</b>	
<b>Anca Segall</b>	LSN331 - (619) 594-4490 <a href="mailto:asegall@sunstroke.sdsu.edu">asegall@sunstroke.sdsu.edu</a>		<b>T 3:15 4:00 pm &amp; By Appointment</b>	
<b>Terry Frey</b>	LSN 332A(am) / 104(pm) - (619) 594-6756 / 3044 <a href="mailto:tfrey@sunstroke.sdsu.edu">tfrey@sunstroke.sdsu.edu</a>		<b>By Appointment</b>	