

Biochemistry, Cell & Molecular Biology II **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. Jacques Perrault

Office: LSN-401

Office Hours: By appointment only

E-mail: jperrault@sunstroke.sdsu.edu

Dr. Terry Frey

Office: LSN 104A / LSN-332A

Office Hours: By appointment only

E-mail: tfrey@sunstroke.sdsu.edu

Time & Locations: **Tuesday and Thursday, 11:00 - 12:15; Friday, 12:00-12:50 in HH-221**

Text: **Molecular Cell Biology, 6th Edition by Lodish, Berk, Kaiser, Krieger, Scott, Bretscher, Ploegh and Darnell. W. H. Freeman and Company, New York, 2008.**

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 or the equivalent (enforced).**

No concurrent registration in Chem 365 will be allowed. Your SDSU grade records will be checked for successful completion of Chemistry 365. Transfer students will need to provide documentation of successful completion of courses equivalent Chem 365 that includes basic biochemistry and molecular biology.

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 are divided into four sections:

Molecular Genetics, Genes, and Chromosomes

Control of Gene Expression

Cellular Functions – Membranes and Transport, Bioenergetics, Protein Targeting

Cytoskeleton and Cell Growth – Cell Cycle Regulation, Stem Cells, Cell Death and Cancer

Lectures will largely be based on the text. Students are not responsible for all material presented in the text but *are responsible for all material presented during lecture and any text material assigned by instructors.*

State Budget Cuts Cause Faculty Furloughs: The devastating California state budget cuts prohibit faculty and staff at SDSU from working on **nine days each semester** during the 2009/10 academic year, and faculty members are prohibited from teaching, being on campus, doing research, and consulting with students on those nine days per semester that they select as Furlough Days. Faculty furlough days vary among faculty members, and your instructors' furlough days that occur on teaching days are indicated on the Lecture Schedule for the course. On those days, classes and office hours are cancelled and telephone and E-mail messages will not be answered. All of your instructor's furlough days including those that do not occur on teaching days will be posted.

The staff furlough causes most University, College, and Department Offices to close on the following days:

Sept 11, 18; Oct 2, 16; Nov 13, 25; Dec 21, 22, 23, 24.

To avoid faculty and staff furloughs at SDSU in the future, you may want to contact your legislators in Sacramento so that they better understand how cutting the state budget for higher education affects your education and your future.

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**, one for each of the sections into which the course is divided, 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 of the above stated exceptions, you must contact the lecturer administering the exam as soon as possible**, preferably before the exam, to make alternate arrangements.

Your overall grade will be based on the average of the four exams. This average exam score must equal at least 50% to pass the course.

We will use the following Grade Scale:

| Letter Grade | Numerical Grade (%) |
|--------------|---------------------|
| A | 80–100% |
| 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% |

Academic Honesty: Cheating or plagiarism will result in a severe grade penalty and will be reported to the Center for Students Rights and Responsibilities, as mandated by California State University policy.

Biology366 Biochemistry, Cell, and Molecular Biology II FALL 2009

| | | Tu/Th 11:00 -12:15 - Fri. 12:00-12:50 - HH 221 | Text Reading | |
|-------------|------------|---|---------------------|-------------------|
| Date | Day | PART ONE: MOLECULAR GENETICS, GENES, AND CHROMOSOMES | | Instructor |
| 9/1 | Tu | Nucleic Acid Structure, Transcription, and Decoding | Ch4: 111-132 | Perrault |
| 9/3 | Th | Protein Synthesis; DNA Replication, Repair, and Recombination | Ch4: 132-154 | Perrault |
| 9/4 | F | Genetic Analysis and Gene Cloning | Ch5: 165-175 | Perrault |
| 9/8 | Tu | Genetic Analysis and Gene Cloning (cont'd) | Ch5: 176-190 | Perrault |
| 9/10 | Th | Expression of Cloned Genes; Locating Genes | Ch5: 191-204 | Perrault |
| 9/11 | F | Chromosomal Organization of Eukaryotic Genes | Ch5: 215-226 | Perrault |
| 9/15 | Tu | Mobile Elements | Ch6: 226-235 | Perrault |
| 9/17 | Th | Genomics; Chromatin Structure | Ch6: 243-252 | Perrault |
| 9/18 | F | Chromatin Structure (cont'd) | Ch6: 253-265 | Perrault |
| 9/22 | Tu | FURLOUGH DAY | | Perrault |
| 9/24 | Th | EXAM I | | Perrault |
| | | PART TWO: CONTROL OF GENE EXPRESSION | | |
| 9/25 | F | Transcriptional Control in Prokaryotes; Lac operon | Ch7: 269-275 | Perrault |

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| 9/29 | Tu | Eukaryotic Transcription Control Elements and RNA Polymerases | Ch7: 276-285 | Perrault |
| 10/1 | Th | Activators and Repressors of Eukaryotic Transcription | Ch7: 286-296 | Perrault |
| 10/2 | F | Pol II Transcription Initiation; Mechanisms of Repression/Activation | Ch7: 296-310 | Perrault |
| 10/6 | Tu | Nuclear Receptors; Pol I and Pol III Promoters | Ch7: 311-319 | Perrault |
| 10/8 | Th | Processing of Eukaryotic Precursor mRNAs and Splicing | Ch8: 323-335 | Perrault |
| 10/9 | F | mRNA Polyadenylation; Alternative Splicing; Transport | Ch8: 335-345 | |
| 10/13 | Tu | Cytoplasmic Post-transcriptional Control; RNA Interference; mRNA Degradation | Ch8: 347-353 | Perrault |
| 10/15 | Th | mRNA-Binding Proteins and Translation Regulation; rRNA and tRNA Processing | Ch8: 353-366 | Perrault |
| 10/16 | F | FURLOUGH DAY | | Perrault |
| 10/20 | Tu | EXAM II | | Perrault |
| | | PART THREE: CELLULAR FUNCTIONS | | |
| 10/22 | Th | Membranes and Membrane Transport | Ch10: 409-426 | Frey |
| 10/23 | F | Membrane Transport (cont'd) | Ch11: 437-462 | Frey |
| 10/27 | Tu | Membrane Transport / Cellular Energetics – Glycolysis | Ch11: 470-472 Ch12: 479-485 | Frey |
| 10/29 | Th | Cellular Energetics – Glycolysis & Citric Acid Cycle (Cont.) | Ch12: 485-493 | Frey |
| 10/30 | F | Cellular Energetics – Electron Transport and ATP Synthase | Ch12: 493-510 | Frey |
| 11/3 | Tu | Cellular Energetics – Photosynthesis | Ch12: 511-529 | Frey |
| 11/5 | Th | Protein Targeting and Transport | Ch13: 533-556 | Frey |
| 11/6 | F | Protein Targeting and Transport (Cont) | Ch13: 557-573 | Frey |
| 11/10 | Tu | Secretion and Endocytosis / Cell Signaling | Ch14: 579-602 Ch15: 623-639 | Frey |
| 11/12 | Th | Cell Signaling (cont.) / Review | Ch15: 640-657 | Frey |
| 11/13 | F | FURLOUGH DAY | | Frey |
| 11/17 | Tu | EXAM III | | |
| | | PART IV: CYTOSKELETON AND CELL GROWTH | | |
| 11/19 | Th | Signaling Pathways | Ch 16: 665-692 | Frey |
| 11/20 | F | Cytoskeleton: Actin and Myosin | Ch17: 713-745 | Frey |
| 11/24 | Tu | Cytoskeleton: Microtubules | Ch18: 757-790 | Frey |

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| 11/26-27 | | THANKSGIVING HOLIDAY | | |
| 12/1 | Tu | Intermediate Filaments, Cell Adhesion, & Extracellular Matrix | Ch18: 791-797 Ch19: 801-824 | Frey |
| 12/3 | Th | Extracellular Matrix (cont.) / Eukaryotic Cell Cycle | Ch19: 847-860 | Frey |
| 12/4 | F | Eukaryotic Cell Cycle (cont.) | Ch19: 860-66; 870-874; 876-82 | Frey |
| 12/8 | Tu | Stem Cells and Cell Differentiation | Ch21: 905-921 | Frey |
| 12/10 | Th | Regulation of Cell Death and Cancer | Ch21: 936-44; Ch25: 1107-1118 | Frey |
| 12/11 | F | Cancer: Tumor Cells, Genetic Basis | Ch25: 1118-1137 | Frey |
| 12/15 | Tu | EXAM IV 10:30-11:45 | | |
| Text: | | *Lodish et al., Molecular Cell Biology 6th Ed., W.H. Freeman & Co | 2008 | |

| Instructor | Contact Information | Office Hours |
|-----------------------------|--|----------------------------|
| Dr. Jacques Perrault | LSN 401 - (619) 594-5150 jperrault@sunstroke.sdsu.edu | By Appointment Only |
| Dr. Terry Frey | LSN 104A – (619) 594-3044 LSN 332A – (619) 594-6756 tfrey@sunstroke.sdsu.edu | By Appointment Only |
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