

Biotechnology– BISC 406L  
Fall 2014

Lectures: TTh 1:00-1:50 p.m., ZHS472  
Lab: Th 2:00-5:00 p.m., ZHS472

Instructor:

Christa Bancroft, Ph.D.  
Office: ZHS470  
Office hours: TTh, 11:00-12:00 p.m.  
Email: [cbancrof@usc.edu](mailto:cbancrof@usc.edu)

Laboratory Director:

Celeste Chong-Cerrillo, Ph.D.  
Office: ZHS450  
Tel/voicemail: 213-740-6085  
Email: [chongcer@usc.edu](mailto:chongcer@usc.edu)

Teaching Assistant:

Prerequisites: BISC 320

Recommended Preparation: BISC 313 or BISC 325

Course Objectives: BISC406L is the capstone course for the Minor in Biotechnology offered by the College of Letters, Arts and Sciences and the Marshall School of Business. The course will focus on the impact of the biotechnology revolution on health care in this age of molecular medicine. Topics to be covered include: (1) Recombinant DNA technology; (2) Genomics and Proteomics; (3) Manipulating Prokaryotic and Eukaryotic gene expression; (4) Molecular Diagnostics and Therapeutics; (5) Vaccines and Gene Therapy; (6) Genetic Engineering of Plants and Animals and; (7) Biotechnology regulation. We will address the ethical, legal and social implications of advances in biotechnology and will discuss governmental regulation of food, drugs and biotechnology itself. The laboratory exercises will focus on recombinant DNA and other DNA techniques, which have played a fundamental role in the “new” biotechnology revolution.

Textbook: Glick, Pasternack, and Patten, Molecular Biotechnology: Principles and Applications of Recombinant DNA (2009, 4<sup>th</sup> edition). Extra reading assignments may also be posted on Blackboard to supplement material in the textbook.

Course Grades:

The course grade will be based upon **605** possible points:

100 pts. Midterm 1  
100 pts. Midterm 2  
100 pts. Final Exam  
50 pts. Classroom participation  
255 pts. Laboratory

In case a midterm exam must be missed for legitimate reasons, discuss the situation with the course instructor **prior** to the exam, if possible. If an exam is missed for an emergency or for a valid health reason (with written documentation), the scores of the other two exams will be prorated to comprise your total point score. Rules governing exams are given in more detail in your Student Contract, which is also posted on the class website: <https://blackboard.usc.edu>.

In the event an error is made in the grading of your exam, written submittal a description of the error, using the regrade form posted on Blackboard, with the exam should be returned to Dr. Bancroft within a week after receiving your graded exam. After this time period, exams will not be regraded.

Lectures: It is important to attend all of the lectures during the course and to take good notes for study. Prior to attending each lecture, it is important to have read the appropriate portions of the textbook. However, many of the lectures will contain new and additional information that is not in the textbook. Examinations will be based mainly on information given in the lectures. In studying for examinations, complete and accurate lecture notes are of prime importance.

The lecture slides posted on the course Blackboard internet site (<https://blackboard.usc.edu>), may contain material that is not in the lectures—and the lectures may contain information that is not conveyed in the Blackboard lecture summaries. The lecture summaries, as posted on Blackboard, and the textbook are intended to be helpful, but auxiliary to the lectures. All course materials, information, announcements and grades will be posted on Blackboard until the end of the semester.

Email Communication:

To ensure privacy, only student's USC email accounts may be used for email communications. Students are responsible for understanding the content of email messages that the instructor sends to their USC accounts. Therefore, each students must check their USC email regularly and make sure their account is not over quota, so new messages can be received.

Statement on Academic Integrity:

USC depends on honesty, integrity, and ethical behavior among its members. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others as well as to avoid using another's work as one's own. All students are expected to understand and abide by these principles.

Resources on academic integrity standards, policies, and expectations:

1. Trojan Integrity Guide: <http://www.usc.edu/student-affairs/SJACS/forms/tio.pdf>
2. Guide for Avoiding Plagiarism: <http://www.usc.edu/student-affairs/SJACS/forms/tig.pdf>
3. Overview of Academic Integrity: <http://www.usc.edu/student-affairs/SJACS/forms/AcademicIntegrityOverview.pdf>

4. Tutorial on Academic Integrity:

[http://www.usc.edu/libraries/about/reference/tutorials/academic\\_integrity/index.php](http://www.usc.edu/libraries/about/reference/tutorials/academic_integrity/index.php)

5. SCampus (University Governance, paragraph 11): [http://web-](http://web-app.usc.edu/scampus/1100-behavior-violating-university-standards-and-appropriate-sanctions/)

[app.usc.edu/scampus/1100-behavior-violating-university-standards-and-appropriate-sanctions/](http://web-app.usc.edu/scampus/1100-behavior-violating-university-standards-and-appropriate-sanctions/)

Statement For Students With Disabilities:

Students requesting academic accommodations based on a disability are required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP when adequate documentation is filed. Please be sure the letter is delivered to Dr. Bancroft as early in the semester as possible. DSP is located in STU 301 and is open 8:30am–5:00pm, Monday through Friday. The phone number for DSP is (213) 740-0776. For more information, please visit the following link:

[http://sait.usc.edu/academicsupport/centerprograms/dsp/home\\_index.html](http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html)

Date	Lecture Topic	Reading
Aug. 26	Intro to Biotechnology	Ch. 1
Aug. 28	Review of DNA and RNA	Ch. 2
Sept. 2	Review of Protein Synthesis	Ch. 2
Sept. 4	Recombinant DNA Technology I	Ch. 3
Sept. 9	Recombinant DNA Technology II	Ch. 3
Sept. 11	PCR and DNA Synthesis Techniques	Ch. 4
Sept. 16	Functional Genomics and Proteomics	Ch. 5
Sept. 18	Manipulation of Prokaryotic Gene Expression	Ch. 6
Sept. 23	<b>Midterm 1</b>	
Sept. 25	Protein Production in Eukaryotic Cells	Ch. 7
Sept. 30	Directed Mutagenesis and Protein Engineering	Ch. 8
Oct. 2	Molecular Diagnostics I	Ch. 9
Oct. 7	Molecular Diagnostics II	Ch. 9
Oct. 9	Protein Therapeutics	Ch. 10
Oct. 14	Nucleic Acid Therapeutics	Ch. 11
Oct. 16	Vaccines I	Ch. 12
Oct. 21	Vaccines II	Ch. 12
Oct. 23	Synthesis of Products by Microorganisms	Ch. 13
Oct. 28	<b>Midterm 2</b>	
Oct. 30	Biomass Utilization	Ch. 14
Nov. 4	Plant Growth Promoting Bacteria	Ch. 15
Nov. 6	Microbial Insecticides	Ch. 16
Nov. 11	Large Scale Production of Proteins	Ch. 17
Nov. 13	Genetic Engineering of Plants	Ch. 18
Nov. 18	Engineering Plants to Overcome Stress	Ch. 19
Nov. 20	Engineering Plant Quality and Proteins	Ch. 20
Nov. 25	Transgenic Animals I	Ch. 21

Nov. 27	Thanksgiving	No lecture	
Dec. 2		Transgenic Animals II	Ch. 21
Dec. 4		Regulating Biotechnology and Societal Issues	Ch. 22/23
		<b>Final Exam, Tues. December 16<sup>th</sup> 11 a.m.-1 p.m.</b>	