San Diego Unified
SCHOOL DISTRICT

JUNIPERO SERRA HIGH SCHOOL

5156 Santo Road
San Diego, California 92124
858-496-8342 x170

INSTRUCTOR

Ericka Senegar-Mitchell, Ph.D.
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COURSE WEBSITE

www.bridgestoliteracy.com

DROP-IN CONFERENCE PERIOD

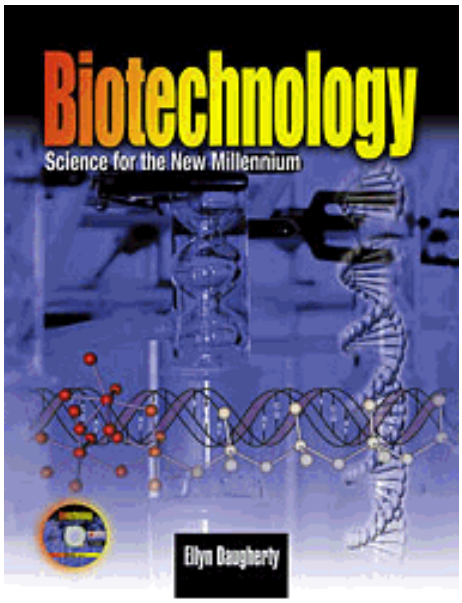
Monday and Friday 2:20-4:30 pm

COURSE PHILOSOPHY

As your instructor, my paramount concern is the development of effective, collaborative, student-centered learning communities. I am committed to the continuous learning and active participation of ALL class members at ALL times. I believe each student is responsible for creating an atmosphere of honesty and trust by openly and respectfully communicating with each other and the instructor. I embrace diversity and respect the individuality of all members of the learning community. I value relevant input from all stakeholders involved in the learning process and I especially encourage young adults to become problem-solvers not problem-dodgers.

COURSE TEXTBOOK

Daugherty, *Biotechnology: Science for the New Millennium*, Paradigm Publishing, 2007.



BIOTECHNOLOGY 1, 2
(6458, 6459)

Grade level: 11–12
Suggested Prerequisites: Biology 1, 2 *and* Chemistry 1, 2; excellent computational skills *and* computer literacy
Course duration: Two semesters
Subject area in which graduation credit is given: Science; UC "d" approved lab credit

COURSE DESCRIPTION

Biotechnology 1, 2 is a two-semester course which provides entry-level as well as advanced training in biotechnology skills, methods and applications. The laboratory-based class integrates the core competencies of the life sciences career pathway and physical sciences with the technical skills needed for postsecondary education and/or employment in the biotechnology industry.

NOTE: Students who complete this course successfully with a grade of "C" or better will have the opportunity to earn community college credit from Miramar College through an articulation agreement.

LABORATORY REQUIREMENT

Students enrolled in Biotechnology will be required to complete labs set forth by the Miramar College Biotechnology Program. Laboratory activities represent more than 25% of the instructional experience in this course. The students' learning activities are intended to prepare them to succeed in receiving passing scores on the Miramar College Biology 131 Challenge Exam administered by Dr. Sandra Slivka, PhD. All students enrolled in the course are encouraged to maintain a "C" average or better in order to be eligible for the challenge exam.

Due to the large amount of time required for laboratory set-up and the mandatory participation of each student in lab activities, it is essential that students are always present on lab days. Although the instructor will assist students with documented excused absences make-up missed lab activities, there is no guarantee that an experience equivalent to the scheduled lab activity will be available.

GRADES

Student grades will be based on the evaluation of all **COMPLETE** laboratory activities, projects, classwork /homework assignments and assessments. Incomplete assignments will **NOT** be awarded partial credit. ALL assignments and assessments are included in the computation of each student's grade, unless otherwise indicated by the instructor, and all coursework carries the same weight. **LATE WORK IS NOT ACCEPTED FOR FULL CREDIT**, but assignments submitted after the due date will be evaluated for its content and feedback given to the student.

Academic Marks

- **A = Outstanding level of performance**
  Student has done excellent work and has mastered the course objectives, consistently does excellent work with skill and thoroughness; and consistently has applied knowledge gained to new situations.
- **B = High level of performance**
  Student has done above average work, mastered almost all of the course objectives; and has applied knowledge gained to new situations.
- **C = Satisfactory level of performance**
  Student has done average work and has mastered many of the objectives of the course.
- **D = Needs improvement in performance**
  Student has done below average work and has mastered few of the objectives of the course.
- **F = Unsatisfactory level of performance**
  Student's work fell below a level of acceptance for the course and was unsatisfactory.

Grade Scale*

Grade	Percentage
A	100 - 90
B	89 - 80
C	79 - 70
D	69 - 50
F	49 - 0

Citizenship Marks

Evaluation codes for work-study habits, attitude, behavior and attendance are:

- E = Excellent level of performance
- G= Good level of performance
- S = Satisfactory level of performance
- N = Needs Improvement in performance
- U = Unsatisfactory level of performance

Citizenship Grades will be based upon the following criteria for each grading period:

- To receive an "E" or "G" **(Excellent or Good)** students must have no more than two tardies (NO tardies for grade of "E"), NO unverified absences and NO missed assignments, be respectful in class to teacher, fellow students and other members of the learning community, adhere to our classroom philosophy and school policies and actively participate in ALL class activities.

- To receive a "S" **(Satisfactory)** students must have no more than three tardies, NO unverified absences, 1-3 missed assignments, display above average classroom behavior and participation, adhere to our classroom philosophy and school policies and actively participate in class activities

- A student may receive a "N" **(Needs Improvement)** for **ONE** of the following violations: accumulating four tardies, 1-2 unverified absences, 4-5 missing assignments, excessive and disruptive talking during instruction or otherwise being a hindrance to the learning process, being disrespectful to the teacher, other students or substitute teacher, not adhering to class or school policies, blatant abuse or vandalism of lab equipment or school property, displaying below average classroom behavior and participation.

- A student may receive a "U" **(Unsatisfactory)** for **ONE** of the following violations: accumulating five or more tardies, three or more unverified absences, more than five missing assignments, flagrant disrespect to the teacher, other students or substitute teacher, defiant behavior or conduct that undermines the class learning environment, consistently exhibiting off task behaviors, lack of academic integrity (cheating, plagiarism, forging progress reports, submitting work NOT their own, etc.)

DISCIPLINARY ACTION

Individual classroom behavior will not only affect the citizenship grade, but it also affects learning readiness and thus can ultimately have a negative influence on academic achievement. We will follow a standard progressive discipline method starting with the student, then involving the parent, and finally sharing the situation with a member of our administrative team.

ATTENDANCE

Members of Biotechnology course MUST adhere to the school-wide attendance program. Please refer to the parent/student handbook for more details. Parents are required to excuse a students' absence by calling the attendance office @ **858-496-8342 ext. 205** by 8am.

PARENTS: It is important to understand that excusing your student from a day of school does not excuse them from the work they should have completed or from assignments that were due on the day of their absence. Student academic progress can be hindered as a result of frequent absences but lower grades can be avoided. Please request class assignments within two weeks of a long-term absence and refer to course website or contact instructor via email for one day excused absences.

Parents are encouraged to monitor student progress and attendance through the district-wide Zangle program at:

zangle ParentConnection

https://dwa.sis.sandi.net/parentconnect/

Biotechnology 1, 2 Course
Syllabus

SEMESTER ONE *Course Syllabus*			
Week	**Unit**	**Laboratory Investigation**	**Topics, Activities, Projects, Assessments**
1-2	Equipment Use and Safety	1. Exercise 1 Documentation in Research 2. Lab 1 Intro to Lab Equipment **(AMGEN)** 3. Producing Enzymes with Bioreactors **(*Shoestring Biotechnology*)** 4. Enzymatic Activity in Laundry Detergents **(*Shoestring Biotechnology*)**	- Cell and Molecular Biology Review, Video: **Safety Training, cGMP, Micropipetting, Volumetrics** - Sterile Techniques/Creating Solutions and Dilutions, Gel Electrophoresis - Student Designed SOP's/Protocols **CHAPTER 1-3, 6**
3-4	Intro to DNA Biotech Industry	1. DNA Extraction - Genes in a Bottle **(BioRad)** 2. Begin Novel, **Biotechnology Unzipped** by Eric S. Grace	- Biotech Timeline, Jobs in Biotechnology, Lab Notebook, Significant Digits, Metric Conversions **CHAPTER 4**
5-6	DNA Manipulation	1. Lab 2 Restriction Analysis **(AMGEN)** 2. Lab 3 Ligation **(AMGEN)** 3. Lab 4 Confirmation of Digest **(AMGEN)**	- DNA Technologies **CHAPTER 8**
7	Bacterial Culturing	Make LB broth, plates, solutions	- Sterilization and Bacteria Culturing (Pseudomonas)
8-9	Transformation	1. Lab 5 Transformation **(AMGEN)** 2. Lab 6 Culturing **(AMGEN)**	- Make GFP purification buffers **CHAPTER 8**
10-11	DNA Purification PCR	1. Size Exclusion Chromatography **(*Shoestring Biotechnology*)** 2. Lab 7 GFP Purification **(AMGEN)** 3. Lab 8 Genomic PCR **(AMGEN)**	- Types of Protein Purification, PCR **CHAPTER 6-7, 9, 13**
12-13	Forensics and DNA	1. Forensic DNA Fingerprinting Kit **(BioRad)** 2. Human STR Polymorphism - Crime Scene Investigator **(BioRad)** 3. Forensic Analysis of Seafood Proteins w/ Protein Electrophoresis **(*ShoestringBiotechnology*)**	- DNA Contamination, History of DNA, Profiling in law enforcement **CHAPTER 5**
14-15	Forensics & Microscopy	Microscopy, Gram stains - Bacteria, Diatoms ID, Fiber/Hair evidence	- Microscope Types, Video: **"Reel Danger: The Stenger Farm Pond Case"**/Diatoms, Pharmacology: Hair testing, Drugs/ Poisons
16	Forensics Analysis	Analysis of Drugs and Poisons **(Ward's Biological)**	- Evidence recovery and analysis - ***The Romanovs: The True Story***

SEMESTER TWO *Course Syllabus*			
Week	**Unit**	**Laboratory Investigation**	**Topics, Activities, Projects, Assessments**
1-2	Medical	1. ELISA Immuno Explorer Simulated HIV Testing **(BioRad)** 2. Genetic Testing Sickle Cell or Cystic Fibrosis 3. The Science of Over-the-Counter Pregnancy Test (Monoclonal Antibodies)	- Monoclonal Antibodies, Cancer, Genetic Counselor (Guest Speaker) **CHAPTER 12**
3	Medical/ Bioinformatics	1. Internet and Computer Gene Analysis 2. RCSB Protein Data Bank 3. HIV Evolution 4. Breast Cancer Gene Detection Lab	- Webquests/Lectures: Microarrays, Human Genome Project, Stem Cells, Bioinformatics **CHAPTER 12**
4	Medical	1. Clinical Immunology: Molecular (Antibodies), Cellular (Leukemia), Tissue (Florescent Probes) 2. Simulation of Protein Identification through Immunoassay Lab **(*Shoestring Biotechnology*)** **3. Field Trips:** Careers in Biotechnology, Industry Visits	- Webquests/Lectures: Pharmacogenomics, Gene Therapy-Cystic Fibrosis, Regenerative Medicine **CHAPTER 12**
5-6	Pharmacology	1. Combinatorial Chemistry and Drug Discovery Lab **(The Scripps Research Institute-TSRI)** 2. Comparative Proteomics: Protein Profiler Module and Western Blot Module **(BioRad)** 3. pGLO Bacterial Transformation Lab **(BioRad)**	- Recombinant Proteins (Insulin, HGF, etc.), Research and Discovery in the Pharmalogical Industry
7-8	Regulatory	1. Monoclonopoly (Starting a Biotechnology Company) 2. Patential Board Game (Drug Discovery)	- FDA, Patents, Clinical Trials, Drug Approval, Phase Testing **CHAPTER 9**
9-10	Agricultural	Genetically Modified Crops; GMO's Investigator Lab **(BioRad)**	- Video: "**Harvest of Fear** "(Discussion and Character Role Play) - Introduce Projects, Preliminary Project Proposals **CHAPTER 10-11**
11-12	Bioremediation	Oil Degrading Lab (Pseudomonas)	- Group Projects: PowerPoint Presentations (Ecological Applications of Biotechnology) **CHAPTER 14**
13-14	Ethics	1. Video-*Ethics of Genetic Testing* **(WEB)** 2. Socratic Seminar - "The Science and Ethics of Stem Cell Research" **(www.nwabr.org)** 3. Plenty of Planaria Regeneration Lab **(www.nwabr.org)**	- Human Cloning, Stem Cell, etc. Project: Research, Handouts & Quizzes
15-16	Student Projects	Student Portfolio, Final Practicum, Student Employment Applications	- Writing samples, performance based assessments, Resume' design

Parent Awareness/Permission Form

My student _____**(print full name)** has my permission to participate in laboratory investigations in Dr. Senegar-Mitchell's AP Biology, Biology or Biotechnology Course. It is understood that instruction/ demonstration on the proper procedure and a detailed written protocol will be given before he/she is allowed to conduct the investigation and that he/she will be properly supervised at all times.

I have reviewed the course syllabus and will discuss course policies for this class with my student. Also, I will notify Dr. Senegar-Mitchell concerning any learning difficulties, disabilities, or special needs of my child.

I give permission for my child to be photographed and/or videotaped while in class. **(*Student photo/video images may be added to course website and will not include student name or any other identifying information*.)**

(Check One) _____**YES** _____**NO**

Signed: _____ Date: _____
(Parent/Guardian)

I _____**(print full name)** agree to observe all safety rules and class procedures for safe investigation and conduct in this course. I will wear safety glasses. gloves (non-latex), and aprons in accordance with state law. I will ask my teacher for help on any piece of the lab equipment that I don't understand how to use properly.

Signed: _____ Date: _____
(Student)