Salt Lake Community College

Biotechnology 2010
DNA Manipulation and Analysis
Itineris Early College High School

Fall 2009

Instructor: Randy Booth Ph.D. Email: rbooth@iechs.org
Course website: http://www.iechs.org/staff/booth/BTEC2010.htm

Course Information: This class meets twice a week for 3 hours.

Course Objectives:
Prereq: BTEC 1020 and BIOL 1610. DNA Manipulation and Analysis is a laboratory-based course designed to teach students the basic principles and techniques associated recombinant DNA technology which is the foundation of biotechnology. Students will become familiar with the tools used in scientific research involving in gene cloning.

Required Materials for each student:
At the Bench – A Laboratory Navigator by Kathy Barker
The New England Biolabs Catalog
A 3-Ring Binder
Sharpie Permanent Marker

Laboratory Fee:
Due to the expense of supplies for this course, a lab fee of **$25** is required of each student enrolled. For an additional Lab fee of $25, each student can receive a personalized Lab coat. Please pay lab fees early at the office. Failure to pay lab fees will result in an incomplete grade.

Grade and Corresponding Percentage

A	93 – 100 %	C+	77 – 79.9%
A-	90 – 92.9%	C	73 – 76.9%
B+	87 – 89.9%	C-	70 – 72.9%
B	83 – 86.9%	D	60 – 69.9%
B-	80 – 82.9%	E	below 60%

Grade Breakdown:

Attendance and Participation	100 pts
Homework (4)	100 pts
Laboratory Notebook (10)	100 pts
Seminar Attendance (3)	75pts
Laboratory Maintenance	50 pts
Midterm	75 pts
Final Paper	100 pts
Total Points	**600 pts**

Evaluation:

Attendance and Participation: Due to the accelerated pace of college courses, that this course is primarily hands on training in the laboratory, and the absence of time for makeup labs, attendance and participation are extremely important. Attendance and participation is worth 17% of the total grade. Points will be awarded based on the percentage of time in class. 25% of the day's value will be deducted for each tardy and at least 50% will be deducted for each way late tardy. The Itineris Early College High School attendance policy applies to this class. Note that if you have more than three absences, you should discuss your progress with the instructor, as it may be necessary to take an I (incomplete) if too many classes are missed.

Homework: As this course content intensive, it is imperative that each student complete the assigned readings and assignments to reinforce the concepts covered in class. A total of 100 points will be made up of homework assignments. The homework assignments must be emailed to the instructor on time to receive full credit. If you anticipate that you may miss a class when an assignment is due, you need to turn it in prior to the due date to receive full credit. If the assignment is turned in within 24 hours of the due date, 25% of the points will be taken away. If the assignment is turned in within 1 week of the due date, 50% of the points will be deducted. No assignment will be accepted if more than one week late.

Laboratory Notebook: During the semester I will make spot checks of individuals' laboratory notebook to monitor their progress and method of scientific documentation. Each check is worth 10 points. Points will be lost if the notebook is not current, legible, or completed following the scientific method.

Seminar Attendance: Attendance at the Biotechnology Seminar Series is worth 25 points per seminar. Seminars will be held as indicated in the posted schedule.

Laboratory Maintenance: Each student will be assigned a roll in maintaining the order of the lab. Assignments will be rotated monthly. Failure to complete your assigned tasks will result in loss of points.

Midterm Exam: A written midterm exam worth 75 points will be given to determine student understanding of the procedures conducted in the lab. Failure to attend class on a test day without prior arrangement or extenuating circumstances will result in grade of zero for that exam.

Final Paper: A final paper will be written by each student for the final grade. The paper should be written as a scientific research paper using the data that each student collected throughout the semester on his/her cloning project. The paper should follow the Journal of Biological Chemistry format and include a title, abstract, introduction with a hypothesis statement, materials & methods, results, discussion, and abstract. A rough draft worth 25 points will be due 2 weeks before the end of the semester. Rough drafts will be returned within a week of the due date so students will have time to make corrections. The final draft must be turned in with the rough draft and will be worth 50 points due the last day of class.

SCHEDULE FOR BIOTECHNOLOGY 2010*

Month	Day	Topic
Aug	27	Introduction to Lab, Safety, Project Overview, Review Assignments, Lab documentation, Measurements Review, calibrate micropipettors,
Sept	1	
	3	
	8	Homework 1 Due
	10	
	15	
	17	
	22	Homework 2 Due
	24	Biotechnology Seminar
	29	
Oct	1	Fall Break
	6	Midterm Exam
	8	
	13	
	15	
	20	
	22	Biotechnology Seminar
	27	Homework 3 Due
	29	
Nov	3	
	5	
	10	Homework 4 Due
	12	
	17	
	19	Biotechnology Seminar
	24	
	26	Thanksgiving Break
Dec	1	
	3	Rough Draft Due
	8	
	10	
	15	Clean Up
	17	Final Paper Due

* This schedule is tentative and may be modified as the semester progresses to better fit the needs of the class

Assignments:

Fill pipette tip boxes – a minimum backup supply of 5 boxes of autoclaved tips of each size needs to be on hand for laboratory use.

Maintain carboy full of dH_2O – Refill the carboy of deionized water as needed.

Autoclave solutions as needed – Maintain the cleanliness of the autoclave and autoclave solutions for use in the lab.

Clean and put away dishes – Load and run the dishwasher and put away the glassware when it is clean.

Make sure all instruments are turned off at the end of class – Verify that all instruments have been turned off at the end of each class.

Maintain the balance and pH area neat and clean – Make sure that the pH probes are submerged in storage buffer, put away any chemicals that have been left out, and clean up and organize around the balances and pH meters.

Clean up area around Sink 1& 2 – Maintain sink 1 by putting dirty glassware in the dishwasher, rinsing out, drying, and putting away any gel boxes, cleaning out anything left in the sink, and restocking gloves as needed.

Clean up area around Sink 3 & 4 – see sink 1& 2

Maintain the carboy of TAE buffer – Refill the carboy with TEA buffer as needed.

Maintain water and ethanol bottles – Make sure all water, 70% ethanol, and 100% ethanol bottles are refilled as needed.

Classroom Policies Biotech 2010

Students' conduct and dress should be in accordance with Jordan School District and Salt Lake Community College policies. Failure to learn the policies is not an excuse. A link for the Jordan School District policy of student conduct can be found on the course website.

Dress Code: Students shall dress in a manner that shows respect for the educational environment and is befitting the day's activities. This means no revealing or skimpy clothing, wear lab coat when conducting experiments, no open toed shoes in the lab (bring and extra pair of shoes if necessary), and eye protection when necessary.

Classroom Behavior: Students who demonstrate through their actions to be a distraction from a learning environment will be dismissed from class for the day. If multiple offenses occur that student may be asked to not return to the class and will receive a failing grade.

Academic Honesty: Students will be expected to adhere to the Itineris Early College High School academic honesty policy. And violation of this policy will result in a minimum of a zero for the assignment and could lead to dismissal from the course with a failing grade. The academic honesty policy can be found at http://www.iechs.org/docs/AcademicHonestyPolicy.pdf.

Cell phones and other electronic devices:
Possession of a cellular telephone by a student is a privilege that may be forfeited by any student that uses their cell phone inappropriately. Cellular telephone use during classroom time, instructional activities and field trips is prohibited. Cellular telephones must remain off during these times. Failure to comply with this policy will result in dismissal from the class for the day with loss of the day's points.

Food:
No food or drink in the laboratory.

Safety:
Students will be working with lethal chemicals. Students will be trained in laboratory safety procedures. Students must return a signed laboratory safety contract to continue to participate in the laboratory activities (see attached contract). **Any activity endangering the safety of any students WILL NOT be tolerated and may result in dismissal from the course.** Contact Dr. Booth if you have any questions about laboratory activities and/or safety issues.

Microbe use:
All bacterial strains used in this course have been selected and genetically altered to be non-pathogenic to humans.

Disease Education:
During the course of Biotechnology the topics of viruses, bacteria, and disease transmission will be discussed. This topic MAY address the issues of AIDS/HIV and other health issues. **State law requires that written parental consent must be obtained before a student can participate in learning about contraception devices and/or substances that includes issues such as AIDS/HIV and that parents be given the opportunity to review the curriculum. The curriculum of this course does not include the topics of contraception, but we will discuss the process of viral infection as it pertains to the field of biotechnology.**

Lab Safety Contract
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For success in our laboratory, everyone must agree to respect the same laboratory rules, to obtain and use the proper safety equipment, and to take appropriate precautions during a lab activity. I as your teacher will prepare you ahead of each lab on the safety issues, but it is up to you to remember good lab protocol and obey those warnings announced ahead of time.

Very Important things to remember:

1. **ABSOLUTELY NO** food or drink in the laboratory. Never eat or drink in the laboratory.
2. NEVER taste chemicals. NEVER directly touch chemicals.
3. No pipetting by mouth.
4. Never work alone in the laboratory.
5. Never perform any experiment not specifically assigned by your teacher.
6. Use lab equipment properly and only after training and instruction.
7. Do not apply cosmetics in the laboratory.
8. It is best not to wear contact lenses in the lab. Chemical vapors can get between the lenses and the eyes and cause permanent eye damage.
9. Know the location of all safety and emergency equipment used in the laboratory.
10. Become familiar with the specific hazards of an experiment before you begin.
11. Before beginning work: tie back long hair, roll up loose sleeves and put on any personal protective equipment required by your teacher.
12. Report any accidents, incidents, or hazards to the teacher immediately.
13. Keep your work area neat and uncluttered.
14. Clean your work area at the conclusion of a lab activity, disinfect your station with bleach solution.
15. Follow the proper disposal of all reagents, sharps, and broken glass.
16. Wash your hands with antibacterial soap and water.
17. Always respect lab work. Due to the amount of students that will utilize the biotech lab, there will be other experiments at or around the workstations. Please leave them alone.

Your commitment to the lab safety rules and your respect of the property in the laboratory are absolutely necessary. If intentional misuse or abuse of the lab and its property is intended, you may be removed from the course.

I understand the disclosure, safety contract, and the importance of safety in the laboratory and agree to conduct myself appropriately by adhering to safe laboratory practices as instructed.

Student's printed name _____
Student's Signature_____ Date_____

My student has discussed with me the disclosure, safety contract, and the importance of safety in the laboratory and I support my student in safe laboratory practices.

Parent/Guardian's Signature_____