

Spring 2016: Biology 210L Biotechniques Lab

Instructors: Dr. Jolene Cogbill, PhD
Dr. Joan Kuh, PhD

Class Meetings: Th 2:30 - 5:20pm, HL1
Fri 2:30 - 5:20pm, HL2

Office Hours: Cogbill - WSC 105, W & F 12:00 - 3:00 or by appointment; jolene.cogbill@chaminade.edu
Kuh - WSC 102, M 1:30-4 PM & W 3-5 or by appointment; joan.kuh@chaminade.edu

Required Text: There is no required text for this lab. All necessary protocols and reading will be provided to you either as handouts or will be posted on E-college

Course Description:

Introduction to biological techniques. Techniques used in the fields of molecular and cellular biology are covered including DNA, RNA and protein purification and manipulation. One three hour period per week.

General Course Objectives:

- To understand basic laboratory safety.
- To learn how to keep a proper laboratory notebook.
- To learn how to operate basic laboratory equipment.
- To be comfortable utilizing basic mathematical calculations necessary in a laboratory setting.
- To perform qualitative and quantitative analysis of nucleic acids and proteins.

Specific Student Learning Outcomes:

At the end of the course, you will be able to:

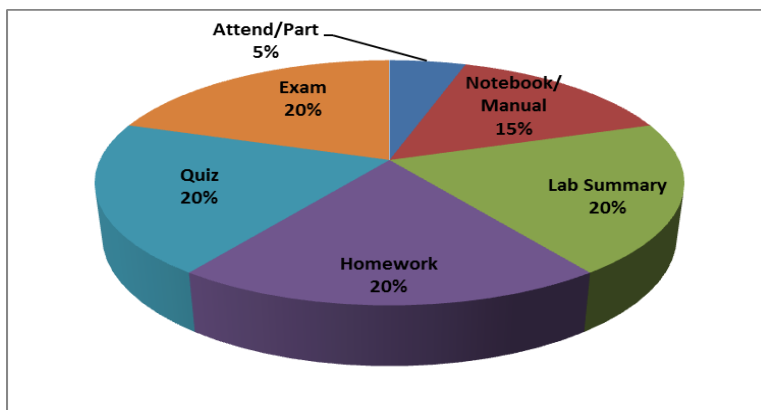
Student Learning Outcomes	Linkage to Biology Program Learning Outcomes
List the safety rules and regulations of a biological laboratory such as those found at Chaminade University as well as know what an SDS is and how to extract information.	#3) The ability to acquire and comprehend information from published scientific literature and to employ computational resources in the resolution of biological problems. #7) An understanding of the entry requirements, career pathways and progression for the major post-graduate fields of research, education and health professions.
Describe potential safety hazards in a laboratory setting including chemical, physical and biohazardous hazards and the practices for dealing with each of these hazards.	#3) The ability to acquire and comprehend information from published scientific literature and to employ computational resources in the resolution of biological problems. #7) An understanding of the entry requirements, career pathways and progression for the major post-graduate fields of research, education and health professions
Keep proper documentation in a laboratory setting including maintenance of a laboratory notebook; start & maintain a lab resource manual containing protocols, safety guidelines, conversion tables and other important information.	#3) The ability to acquire and comprehend information from published scientific literature and to employ computational resources in the resolution of biological problems. #7) An understanding of the entry requirements, career pathways and progression for the major post-graduate fields of research, education and health professions
Perform basic mathematical calculations including scientific notation and algebraic conversions essential to the preparation of solutions and quantitation of molecules including standard curve analysis and regression analysis.	#2) ability to visualize, statistically evaluate, validate and interpret scientific data, and to communicate science effectively both orally and in writing #3) The ability to acquire and comprehend information from published scientific literature and to employ computational resources in the resolution of biological problems. #7) An understanding of the entry requirements, career pathways and progression for the major post-graduate fields of research, education and health professions

Conduct basic statistical operations on a dataset that includes average, standard deviation and assessment of significant differences using a basic program such as Excel.	#2) ability to visualize, statistically evaluate, validate and interpret scientific data, and to communicate science effectively both orally and in writing #3) The ability to acquire and comprehend information from published scientific literature and to employ computational resources in the resolution of biological problems. #7) An understanding of the entry requirements, career pathways and progression for the major post-graduate fields of research, education and health professions
Formulate and prepare solutions that contain one or more solutes for a laboratory experiment. This includes the ability to accurately measure volumes of liquids that range from hundreds of milliliters to the microliter range that may include serial dilutions.	#3) The ability to acquire and comprehend information from published scientific literature and to employ computational resources in the resolution of biological problems. #7) An understanding of the entry requirements, career pathways and progression for the major post-graduate fields of research, education and health professions
Properly and accurately operate basic biology lab instrumentation including pipettes, incubators, pH meters, spectrophotometers, and thermocyclers.	#3) The ability to acquire and comprehend information from published scientific literature and to employ computational resources in the resolution of biological problems. #7) An understanding of the entry requirements, career pathways and progression for the major post-graduate fields of research, education and health professions
Manipulate and quantitate biological molecules, such as nucleic acids and proteins, using common molecular biology techniques such as PCR, ELISA, Western Blots, and Spectroscopy; and subsequently analyzing the generated data.	#2) ability to visualize, statistically evaluate, validate and interpret scientific data, and to communicate science effectively both orally and in writing #3) The ability to acquire and comprehend information from published scientific literature and to employ computational resources in the resolution of biological problems. #7) An understanding of the entry requirements, career pathways and progression for the major post-graduate fields of research, education and health professions

Expectations of students: The following are what is expected of students:

- Attend labs.
- Know assignment and test dates.
- Be prompt, both in attendance and in turning in of assignments.
- Read assignments BEFORE coming to lab.
- Be responsible & proactive. If you miss a class, ask your classmates and/or your instructor for the information you missed; approach the other BI210L instructor to inquire about making up the lab in their section. It is **YOUR** responsibility to pick up any handouts that were distributed.
- Ask the instructor for assistance way in advance. DO NOT WAIT until the day of the exam or the day when an assignment is due to ask questions.
- Respect. It works both ways.
- **Remember, the knowledge that you will take away from your courses is directly proportional to what you put into your courses so keep a positive attitude and work hard!**

Grading:



Laboratory notebook:

- All students are required to maintain a bound laboratory notebook into which ALL laboratory information and data is to be entered. Lab notebooks are graded twice and handed in on exam days.
- The notebooks must be bound with non-tear out pages. Spiral notebooks are unacceptable, as are three holed folder paper.
- Additional formatting information will be available on E-college

Attendance/Participation:

- Presence in class is mandatory & necessary in order for a student to fully grasp concepts. Students are expected to attend regularly all courses for which they are registered. Students should notify their instructors when illness or other extenuating circumstances prevents them from attending class and make arrangements to complete missed assignments. Notification may be done by emailing the instructor's Chaminade email address, calling the instructor's campus extension or by leaving a message with the instructor's division office (Natural Science and Math 1 (808) 440-4204). It is the instructor's prerogative to modify deadlines of course requirements accordingly. Any student who stops attending a course without officially **withdrawing** may receive a failing grade.
- Unexcused absences equivalent to more than a week of classes may lead to a grade reduction for the course. Any unexcused absence of two consecutive weeks or more may result in being **withdrawn** from the course by the instructor, although the instructor is not required to **withdraw** students in that scenario. Repeated absences put students at risk of failing grades.
- If you miss a class it is **YOUR** responsibility to ask the instructor or your classmates for the information that you missed and to pick up any handouts that may have been distributed.
- You are expected to be an active and contributing member in all group work.

Key to assignment types:

- "Worksheet" is an exercise that will be collected and graded and counts as "homework"
- Pre-lab exercises and LOQs are questions and calculations that should be completed prior to lab in your lab notebook. Quiz questions will be primarily on LOQ material but there may be a question on the pre-lab exercises. You will be able to use your lab notebook for the quiz.
- The written summary will be on the DNA cloning exercises conducted in weeks 6-9. You will be required to submit this summary twice—initially as a draft and then as a final form with corrections

(if you choose to make them!). Both drafts are to be submitted in WORD format at the dropbox at ecollege.

Makeup exams and extra credit:

- Makeup exams and quizzes are generally not given. If there is an insurmountable problem please come talk to your instructor to see what arrangements can be made.

Departmental and University Policies:

- *Music Devices and Cellular Phones:* Use of music devices and cell phones is prohibited during all Natural Science and Mathematics classes at Chaminade, unless specifically permitted by your instructor. Use of cellphones and music devices in laboratories is a safety issue. In addition, use of cellphones and music devices in any class is discourteous and may lead to suspicion of academic misconduct. Students who cannot comply with this rule will be asked to leave class and may be subject to laboratory safety violation fines. You will be asked to leave class and marked absent if you do not comply. This will negatively affect your grade. Please refer any questions to the Dean of Natural Sciences and Mathematics.
- *ADA Accommodations:* Pursuant to several federal and state laws, including the Americans with Disabilities Act of 1990, as amended by the ADA Amendments Act of 2008, and Section 504 of the Rehabilitation Act of 1973, all qualified students with disabilities are protected from discrimination on basis of disability and are eligible for reasonable accommodations or modifications in the academic environment to enable them to enjoy equal access to academic programs, services, or activities. If a student would like to determine if they meet the criteria for accommodations, they should contact the Counseling Center at 808-735-4845 for further information. Students with special needs who meet criteria for the Americans with Disabilities Act (ADA) provisions must provide written documentation of the need for accommodations from CUH Counseling Center (Dr. June Yasuhara, 735-4845) by the end of the third week of classes. Failure to provide written documentation will prevent your instructor from making necessary accommodations.
- *Policy on Communication :* The University provides a Chaminade email address for all students. Official Chaminade communications will be sent to the students' Chaminade email address and instructors will use only this email to communicate with students. It is the responsibility of the student to check their email frequently. Report email-related problems to the Helpdesk at 808-735-4855 or helpdesk@chaminade.edu.
- *Title IX Declaration:* Chaminade University of Honolulu recognizes the inherent dignity of all individuals and promotes respect for all people. Sexual misconduct, physical and/or psychological abuse will NOT be tolerated at CUH. If you have been the victim of sexual misconduct, physical and/or psychological abuse, we encourage you to report this matter promptly. As a faculty member, I am interested in promoting a safe and healthy environment, and should I learn of any sexual misconduct, physical and/or psychological abuse, I must report the matter to the Title IX Coordinator. Should you want to speak to a confidential source you may contact the following:
Chaminade Counseling Center | 808 735-4845.
Any priest serving as a sacramental confessor or any ordained religious leader serving in the sacred confidence role.
- *Academic Honesty:* Students are expected to have read and to abide by the "Student Rules of Conduct" which are available in your copy of Chaminade University's Student Handbook. Cheating in the form of plagiarism, collusion, and deception will not be tolerated and will negatively affect your grade.

Because the university is an academic community with high professional standards, its teaching function is seriously disrupted and subverted by academic dishonesty. Such dishonesty includes, but is not limited to, cheating, which includes giving/receiving unauthorized assistance during an examination; obtaining information about an examination before it is given, using inappropriate/unallowed sources of information during an examination; altering answers after an examination has been submitted; and altering the records on any grade. (Refer to the CUH catalog for further information).

Tentative Course Outline (subject to change as instructor deems necessary)

Week	Date	Lab topic	Assignments
1	Jan 14 & 15	Lab Safety, Lab Tours, Lab Notebook, Lab Ware: ID & Function	Take Lab Safety Quiz on e-college
2	Jan 21 & 22	Basic Lab Mathematics, Scientific Notation & Microscopes <i>Guest Speaker: Prof. Sheryl Dohm</i>	Due Week 3: Read Solution & Dilution Handout Soln & Dil Math Worksheet; Pre-Lab
3	Jan 28 & 29	Solutions & Dilutions; pH, Weight & Volume Measurements	Due Week 4: Protein LOQs Week 4 BSA Standard Curve Pre-lab
4	Feb 04 & 05	QUIZ; Protein Quantification & Standard Curve; Spectrophotometry <i>Guest Speaker: Prof. Eric Dodson</i>	Due Week 5: graph your standard curve data using Xcel or another graphing program Statistics WS
5	Feb 11 & 12	Regression Coefficients : Micropipettes & Dilutions revisited	Due Week 6: DNA & PCR LOQ Setting up a PCR pre-lab
6	Feb 18 & 19	QUIZ; Genomic DNA Extraction & PCR	Due Week 7: Setting up ligation Pre-lab Electrophoresis & Cloning LOQs
7	Feb 25 & 26	QUIZ; Electrophoresis, Cloning & Transformation	Due Week 8: Plasmid characteristics Pre-lab
8	Mar 03 & 04	Plasmid DNA Extraction, Quantitation & Sequencing	Due Week 9: Nuttin'
9	Mar 10 & 11	Database Analysis	Due Week 10: ELISA Pre-Lab & LOQs Written Summary labs 6-9 –1 st draft
10	Mar 17 & 18	QUIZ; ELISA <i>Guest Speaker: Mr. Eric Collier</i>	Due Week 11: More Protein LOQs
	Mar 21-25	Spring Break	
11	Mar 31 & Apr 01	QUIZ; Protein Isolation and Quantitation	Due Week 12: Western Pre-Lab and LOQs
12	Apr 07 & 08	QUIZ; Western Blots—Gels & Buffers <i>Guest Speaker: Ms. Lori Shimoda & Dr. Brit Sato</i>	Due Week 13: Written Summary labs 6-9 final draft More WB LOQs
13	Apr 14 & 15	QUIZ; Western Blots -Run Gels & Transfer	Assignment TBA
14	Apr 21 & 22	Western Blots--Detection	Study for Exam
15	Apr 28 & 29	EXAM	

Note: Every effort has been made to insure that the material in this syllabus is accurate and complete. However, occasionally changes must be made in the printed schedule. Thus the instructor reserves the right to make any changes in the contents of this syllabus that she deems necessary or desirable. These changes, if any, will be announced as soon as the need for them becomes apparent.